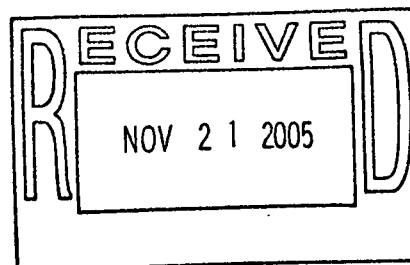


**ASH PITS
GROUNDWATER CONTAMINATION**

SUMMARY REPORT

**ROCKY FLATS ENVIRONMENTAL
TECHNOLOGY SITE
10808 HIGHWAY 93
GOLDEN, CO 80403-8200**

SEPTEMBER 8, 2005



**Document Classification
Review Waiver per
Classification Office Waiver
No: CEX- 105-01**

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BZ-A-000938

1/42

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EXECUTIVE SUMMARY

On March 5, 2003 CDPHE provided to DOE via electronic mail an "Assessment of RFETS Ground Water Status and Needs." In this assessment, CDPHE expressed their opinion that the wells at the Ash Pits were not placed in the areas of the highest soil concentrations previously identified at the sites. CDPHE suggested that the Ash Pits had the potential to impact groundwater and surface water quality and should be adequately investigated with properly placed wells.

The No Further Accelerated Action (NFAA) for the Ash Pits issued by Kaiser-Hill in May 2003 proposed that the groundwater monitoring network in the vicinity of the Ash Pits be evaluated between now and Site closure to determine its adequacy in detecting releases from the Ash Pits. The NFAA suggested that a new well(s) would be added if appropriate.

A review of the existing monitoring network in the vicinity of the Ash Pits was completed by Kaiser-Hill during the summer of 2003. Through the RFCA consultative process with the regulatory agencies, it was determined that two additional wells were needed to adequately complete the groundwater monitoring network to detect releases from the Ash Pits. DOE installed two additional wells (13103 and 13403) at the Ash Pits in 2003 to complete the groundwater monitoring well network. These wells were installed in the areas of highest soil concentrations or activities detected during previous Ash Pit investigations. The wells were installed and sampled per well installation and sampling project work plans (K-H 2003; K-H 2004), documents that were reviewed by the regulatory agencies.

Groundwater and surface water data evaluated and presented in this report document that the historical groundwater and surface water monitoring network adequately detected potential releases from the Ash Pits. This evaluation found that constituents that exceed the surface water standards generally only occur at a single well and do not form contiguous, mappable contaminant plumes. Results presented in this report support the conclusion previously reached by the Integrated Monitoring Plan (IMP) Water Working Group that no additional groundwater or surface water monitoring is required in the vicinity of the Ash Pits. The fiscal year (FY) 2005 IMP does not require groundwater monitoring in the vicinity of the Ash Pits.

1.0 INTRODUCTION

This Ash Pits Groundwater Contamination Summary Report (SR) was prepared to support the No Further Accelerated Action (NFAA) previously developed for the Ash Pits (DOE 2003). The purpose of this SR is to define the current nature and extent of groundwater analytes of interest (AOIs) in the upper hydrostratigraphic unit (UHSU) at the Ash Pits. The UHSU at RFETS consists of the unconsolidated surficial deposits, weathered bedrock, and sandstones (e.g., the Arapahoe No. 1 Sandstone) hydraulically connected to the overlying strata. The lower hydrostratigraphic unit (LHSU) underlies the UHSU and is comprised of the unweathered bedrock of the Arapahoe and upper Laramie Formations that underlie the UHSU. AOIs are those

analytes that are present above background and the surface water standards¹ or drinking water maximum contaminant levels (MCLs)² and form contiguous, mappable contaminant plumes.

The Ash Pits are located in the Woman Creek drainage basin on the south-facing hillslope north of the confluence of Owl Branch and Woman Creek. Figure 1 shows the location of the Individual Hazardous Substance Sites (IHSS) comprising the Ash Pits (IHSS 133.1 through 133.4) and Potential Areas of Concern (PACs), SW-1701 and SW-1702. This figure also shows other features discussed in this report including the former incinerator (IHSS 133.5), the concrete wash pad (IHSS 133.6), Woman Creek, Owl Branch, and groundwater and surface water monitoring locations.

2.0 HISTORY OF THE ASH PITS

The history of the Ash Pits is not well known as few records were kept of their operations. According to the Historical Release Report (DOE 1992b), these trenches were used for disposal of potentially contaminated ash from the incinerator (IHSS 133.5), which operated from 1952 to 1968, and other noncontaminated trash from various sources at the site. Depleted uranium is also thought to have been burned in the incinerator (Rockwell 1988) and disposed in the Ash Pits. Following the shutdown of the incinerator in 1968, the Ash Pits were covered with fill (Rockwell 1988). The areal extent and boundary of the Ash Pits was approximately determined from historical aerial photographs (EPA 1988) and historical accounts of the area. The Historical Release Report (DOE 1992b) also states that the ashes in these trenches were evaluated in 1970 and considered to present no problems unless disturbed and inhaled.

3.0 PREVIOUS WORK AT THE ASH PITS

Groundwater and surface water monitoring has been conducted in the area of the Ash Pits since about 1974. The earliest known groundwater monitoring wells (1374 and 1474) were installed in 1974 in response to routine environmental monitoring conducted at the site. Subsequently, in 1986, an additional groundwater monitoring well (5686) was installed to comply with RCRA monitoring requirements. The most extensive characterization and monitoring activities (DOE 1992a; DOE 1993; DOE 1994; DOE 1996) were conducted in 1993 and 1994 during the implementation of the Operable Unit 5 (OU 5) Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI). During this investigation, 3 monitoring wells and 19 well points were installed in the area of the Ash Pits to facilitate water level measurements and groundwater quality monitoring.

On March 5, 2003 CDPHE provided to DOE via electronic mail an "Assessment of RFETS Ground Water Status and Needs." In this assessment, CDPHE expressed their opinion that the

¹ Colorado Water Quality Regulations apply surface water standards as the groundwater quality standards for RFETS groundwater with the use classification defined as surface water quality protection [see 5 Colorado Code of Regulations (CCR) 1002-42.7(1)]. The groundwater quality standards are the RFETS site-specific and statewide standards in 5 CCR 1002, specifically statewide surface water radioactive materials standards in Section 31.11(2); statewide surface water interim organic pollutant standards in Section 31.11(3); and site-specific surface water quality standards for segments 4a, 4b, and 5 of Big Dry Creek in Section 38.6 of the South Platte Basin Classifications and Standards.

² MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed at 40 CFR 141. Where an MCL for a particular contaminant is lacking, the residential groundwater ingestion-based Preliminary Remediation Goal (PRG) value will apply. If the practical quantitation limit (PQL) is higher than the surface water standard, MCL, or PRG, the PQL is used as the comparison value. For simplicity, MCLs, PRGs, and PQLs are hereinafter referenced as MCLs.

wells at the Ash Pits were not placed in the areas of the highest soil concentrations previously identified at the sites. CDPHE suggested that the Ash Pits had the potential to impact groundwater and surface water quality and should be adequately investigated with properly placed wells.

The No Further Accelerated Action (NFAA) for the Ash Pits issued by Kaiser-Hill in May 2003 proposed that the groundwater monitoring network in the vicinity of the Ash Pits be evaluated between now and Site closure to determine its adequacy in detecting releases from the Ash Pits. The NFAA suggested that a new well(s) would be added if appropriate.

A review of the existing monitoring network in the vicinity of the Ash Pits was completed by Kaiser-Hill during the summer of 2003. Through the RFCA consultative process with the regulatory agencies, it was determined that two additional wells were needed to adequately complete the groundwater monitoring network to detect releases from the Ash Pits. DOE installed two additional wells (13103 and 13403) at the Ash Pits in 2003 to complete the groundwater monitoring well network. These wells were installed in the areas of highest soil concentrations or activities detected during previous Ash Pit investigations. The wells were installed and sampled per well installation and sampling project work plans (K-H 2003; K-H 2004), documents that were reviewed by the regulatory agencies.

The locations of all of the groundwater and surface water monitoring wells and stations installed in the area of the Ash Pits since 1986 have been approved by the regulatory agencies either as a result of their review, comment, and approval of work plans or through the consultative process under RFCA.

4.0 HYDROLOGY AND HYDROGEOLOGY OF THE ASH PITS

As previously mentioned, the Ash Pits are located on the south-facing hillslope north of the confluence of Woman Creek and Owl Branch in the upper reaches of the Woman Creek drainage basin. Surface water flow in this area is from north to south across the Ash Pits towards Woman Creek. All surface water runoff from the Ash Pits enters Woman Creek. The Ash Pits are located between about 200 and 580 feet from Woman Creek.

Site characterization studies at the Ash Pits have shown that the Ash Pits are situated on colluvium and Rocky Flats Alluvium (RFA) that is unconformably underlain by weathered and unweathered bedrock of the Arapahoe Formation. The colluvium, RFA, and weathered bedrock are considered part of the UHSU. The thickness of the unconsolidated materials, colluvium and RFA, and, thus, the depth to the top of weathered bedrock, in the immediate area of the Ash Pits ranges between about 3 and 34 feet.

Groundwater levels measured at the Ash Pits have shown that the UHSU is temporally saturated. During the spring and early summer, the UHSU is saturated throughout the Ash Pits area as shown by the potentiometric surface for the second quarter 2003 (Figure 2; DOE 2004). As shown in Figure 2, groundwater flow during the saturated period is from north to south where it likely discharges to Woman Creek. The UHSU is largely unsaturated (i.e., dry) during 4th quarter 1994 as shown on Figure 3 (DOE 1996) and saturated groundwater flow does not appear to occur locally. These temporally saturated conditions would exert significant control on the

extent of contaminant plumes (if they were formed) and limit the rate of contaminant transport to Woman Creek.

5.0 EVALUATION OF GROUNDWATER AND SURFACE WATER QUALITY DATA

5.1 Data Source

Data used in this SR are the result of previous investigations conducted at the site, from site-wide sampling programs, and as data were collected during the site-wide RI/FS effort to support the CRA. The groundwater nature and extent discussion presented in this SR is based on data collected between June 28, 1991³ and July 31, 2005. Groundwater and surface water data used in this evaluation were extracted from the August 16, 2005 CRA data superset.

5.2 Data Adequacy and Quality

Data adequacy and quality were assessed in Appendix A, Volume 2 of the Sitewide RI/FS (K-H 2005). The distribution of data, both spatially and temporally, was assessed to ensure that the nature and extent of contamination is well characterized. The results of the data adequacy assessment are presented in the Data Adequacy Report (RI/FS Appendix A, Volume 2, Attachment C). Data quality was assessed using a standard precision, accuracy, representativeness, completeness, and comparability (PARCC) parameter analysis (EPA 2000). The Data Quality Assessment presented in Appendix A, Volume 2, Attachment D is based on an evaluation of site-wide field and laboratory control samples. Groundwater and surface water data used in this evaluation met data adequacy and data quality criteria for the CRA.

6.0 IDENTIFICATION OF ANALYTES OF INTEREST (AOI)

Analytes of interest (AOIs) at the Ash Pits were identified using the screening approach developed for the Groundwater and Surface Water Nature and Extent Summary Reports (KH 2005a; KH 2005b) and summarized on Figure 4. Details of this screening approach can be found in the Groundwater or Surface Water and Sediment Nature and Extent Summary Reports. Analytes were screened using this approach to determine the preliminary AOIs (Table 1).

6.1 Results of Ash Pits UHSU Groundwater Preliminary AOI Screening

The results of the preliminary AOI screening (Screens 1 through 3) are shown in Table 1. Twenty-six preliminary AOIs were identified at the Ash Pits. Preliminary AOIs are those constituents that had a result above the lowest surface water standard at least once (i.e., a frequency of detection greater than 0%). The percentage of results that exceeded the lowest surface water standard for the preliminary AOIs ranged between about 2 (methylene chloride)

³ This date correlates to approved workplans and sampling and analysis plans (SAPs) developed pursuant to the 1991 Inter-Agency Agreement (IAG).

and 100 percent (Ra226 + Ra228). Seven constituents had results that had a frequency of detection above the lowest surface water standard between greater than or equal to 1 and less than 5 percent. An additional 19 constituents had results that had a frequency of detection above the lowest surface water standard between 5 and 100 percent.

6.2 Results of Ash Pits UHSU AOI Screening

To facilitate the final constituent AOI screening (Screens 4 through 5), maps were made showing the most recent result at each well in the area of the Ash Pits. These maps are shown as Figures 5 through 30. Surface water results are also shown on these figures. Review of these maps shows that none of the constituents form contiguous, mappable contaminant plumes. For a plume to be defined as contiguous and mappable, it must have at least three adjacent wells within an approximate radius of about 300 feet from one another. Most of the preliminary AOIs were only found as single well occurrences that were surrounded by wells where the constituent was either not detected or was detected at concentrations less than the lowest surface water standard. Thus, based on these final screening steps, no groundwater AOIs were identified in the UHSU at the Ash Pits.

6.3 Results of Ash Pits Surface Water Preliminary AOI Screening

None of the surface water results exceed a 1% frequency of detection above the surface water standard. Therefore, no surface water preliminary AOIs were identified. Figures 5 through 30 show the most recent surface water results, where available, for the groundwater preliminary AOIs at the surface water stations nearest the Ash Pits.

6.4 Results of Ash Pits Surface Water AOI Screening

None of the recent surface water results exceeded the surface water standards, therefore, no surface water AOIs were identified in the area of the Ash Pits.

7.0 CONCLUSIONS

Groundwater and surface water data evaluated and presented in this report document that the historical groundwater and surface water monitoring network adequately detected potential releases from the Ash Pits. This evaluation found that constituents that exceed the surface water standards generally only occur at single wells and do not form contiguous, mappable contaminant plumes. Similarly, no surface water constituents exceed the surface water standards at a 1% frequency of detection. This evaluation indicates that surface and subsurface soil constituents that are present at the Ash Pits do not appear to significantly impact groundwater or surface water quality in the area of the Ash Pits. Therefore, no further accelerated action is recommended at the Ash Pits to limit potential groundwater and surface water quality impacts. Results presented in this report support the conclusion previously reached by the Integrated Monitoring Plan (IMP) Water Working Group that no additional groundwater or surface water

monitoring is required in the vicinity of the Ash Pits. The fiscal year (FY) 2005 IMP does not require groundwater monitoring in the vicinity of the Ash Pits.

8.0 REFERENCES

DOE, 1992a, Final Phase I RFI/RI Work Plan Revision 1, Rocky Flats Plant, Woman Creek Priority Drainage (Operable Unit No. 5), Volume 1 – Text, EG&G Rocky Flats, Environmental Restoration Program, Rocky Flats Plant, Golden, Colorado, 21100-WP-OU-05.1, February.

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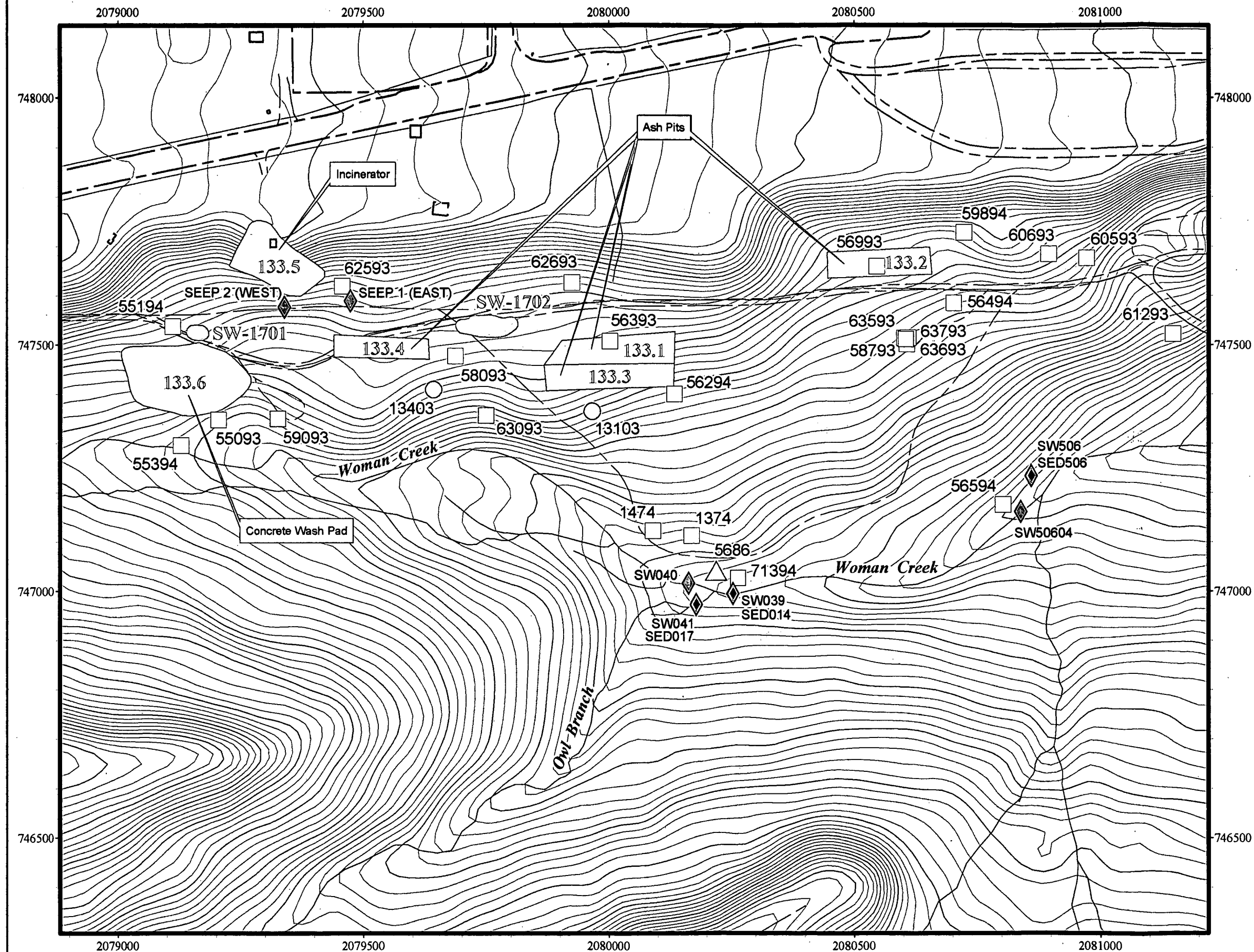
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Rockwell, Inc. (1988), Draft Remedial Investigation and Feasibility Study Plans for Low Priority Sites, Rocky Flats Plant, Golden, Jefferson County, Colorado, Volume 1, June.

Table 1
Ash Pits Preliminary Analyses of Interest (AOI)

Analyte Group	Total or Dissolved	Analyte	Number of Samples	Maximum Detection	Maximum Result Qualifier	Reporting Units		Analyte of Interest Screen 1 Comparison with Background				AOI Screen 2	Analyte of Interest Screen 3 Comparison with Lowest Surface Water Standard					AOI Screen 4	AOI Screen 5	Is Constituent Analyte of Interest ?	
						99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (i.e., Total or Dissolved)	Site-Specific PQL		Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard ?				Are There Contiguous Plumes ?
VOC	Total	Methylene Chloride	51	13		UG/L	-----	-----	-----	-----	Yes	1	4.6	4.6	1	1.96	Yes	No	-----	No	
RAD	Total	Americium-241	47	2,321		PC/L	0.03	5	10.64	Yes	Yes	0.03	0.15	0.15	1	2.13	Yes	No	-----	No	
WOP	Total	Fluoride	46	3270		UG/L	1710.92	1	2.17	Yes	Yes	500	2000	2000	1	2.17	Yes	No	-----	No	
METAL	Total	Silver	72	238		UG/L	-----	-----	-----	Yes	Yes	5	100	100	2	2.78	Yes	No	-----	No	
METAL	Dissolved	Silver	98	6.7		B	UG/L	7.79	0	0.00	No	Yes	5	5	4	4.08	Yes	No	-----	No	
METAL	Dissolved	Copper	98	26.5		UG/L	15.32	2	2.04	Yes	Yes	3	12.1	12.1	4	4.08	Yes	No	-----	No	
RAD	Total	Plutonium-239/240	48	2.31		PC/L	0.06	3	6.25	Yes	Yes	0.03	0.15	0.15	2	4.17	Yes	No	-----	No	
METAL	Total	Cadmium	72	67.4		UG/L	-----	-----	-----	Yes	Yes	5	5	5	4	5.56	Yes	No	-----	No	
METAL	Total	Antimony	64	26.8		B	UG/L	49.14	0	0.00	No	Yes	10	10	4	6.25	Yes	No	-----	No	
WOP	Total	Ammonia (as N)	28	2938		UG/L	-----	-----	-----	Yes	Yes	100	500	500	2	7.14	Yes	No	-----	No	
METAL	Dissolved	Iron	98	2380		UG/L	320.57	8	8.16	Yes	Yes	100	300	300	8	8.16	Yes	No	-----	No	
METAL	Total	Copper	72	1580		UG/L	39.12	20	27.78	Yes	Yes	3	200	200	6	8.33	Yes	No	-----	No	
METAL	Total	Barium	36	2650		UG/L	208.14	12	33.33	Yes	Yes	100	1000	1000	3	8.33	Yes	No	-----	No	
WOP	Total	Cyanide	29	9		B	UG/L	-----	-----	Yes	Yes	5	5	5	3	10.34	Yes	No	-----	No	
METAL	Total	Nickel	72	313		UG/L	32.68	20	27.78	Yes	Yes	20	100	100	10	13.89	Yes	No	-----	No	
METAL	Dissolved	Aluminum	48	3910		UG/L	262.91	4	8.33	Yes	Yes	17	87	87	7	14.58	Yes	No	-----	No	
METAL	Total	Lead	72	715		UG/L	11.75	20	27.78	Yes	Yes	10	50	50	12	16.67	Yes	No	-----	No	
METAL	Total	Beryllium	36	29.4		UG/L	-----	-----	-----	Yes	Yes	5	4	5	7	19.44	Yes	No	-----	No	
METAL	Dissolved	Manganese	98	765		UG/L	184.57	12	12.24	Yes	Yes	15	50	50	20	20.41	Yes	No	-----	No	
RAD	Total	Uranium Isotopes *	52	3399.64		PC/L	114.49	4	7.69	Yes	Yes	0.685	10	10	14	26.92	Yes	No	-----	No	
METAL	Total	Chromium	72	1100		UG/L	22.58	34	47.22	Yes	Yes	2	50	50	26	36.11	Yes	No	-----	No	
METAL	Total	Manganese	72	3520		UG/L	331.64	24	33.33	Yes	Yes	15	200	200	34	47.22	Yes	No	-----	No	
RAD	Total	Gross Beta	19	2899		PC/L	221.31	3	15.79	Yes	Yes	4	8	8	12	63.16	Yes	No	-----	No	
RAD	Total	Gross Alpha	19	3038		PC/L	390.58	2	10.53	Yes	Yes	2	7	7	13	68.42	Yes	No	-----	No	
METAL	Total	Iron	72	418000		UG/L	14654.53	22	30.56	Yes	Yes	100	1000	1000	60	83.33	Yes	No	-----	No	
RAD	Total	Ra-226 + Ra-228	4	157.4		PC/L	6.29	4	100.00	Yes	Yes	1	5	5	4	100.00	Yes	No	-----	No	
1																				Uranium isotopes is the sum of all of the available uranium isotopes for each sample. The individual isotopes typically include U-233, U-234, U-235, and U-238.	
-----																				Not applicable.	
																				The frequency of detection of the analyte concentration above the surface water standard is greater than (>) or equal to 1 % and less than (<) 5 %.	
																				The frequency of detection of the analyte concentration above the surface water standard is greater than (>) 5 %.	

Figure 1
Ash Pits Groundwater and
Surface Water Monitoring
Locations



Legend

- Surface water sampling location
- Sediment sampling location
- Existing well installed after 1/1/2000
- Existing well installed between 1/1/1990 and 12/31/1999
- Existing well installed before 1/1/1990
- Abandoned well installed after 1/1/2000
- Abandoned well installed between 1/1/1990 and 12/31/1999
- Abandoned well installed before 1/1/1990
- Individual Hazardous Substance Site (IHSS) location
- Potential Area of Concern (PAC) location

Standard Map Features

- Existing or demolished building or structure
- Lake or pond
- Stream, ditch, or other drainage feature
- Paved road
- Dirt road
- Trail
- Fence
- Site boundary
- Topographic contour (2-foot)

N
W E
S

200 0 200

Scale in Feet

Scale = 1 : 2,400
 1 inch represents 200 feet

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site

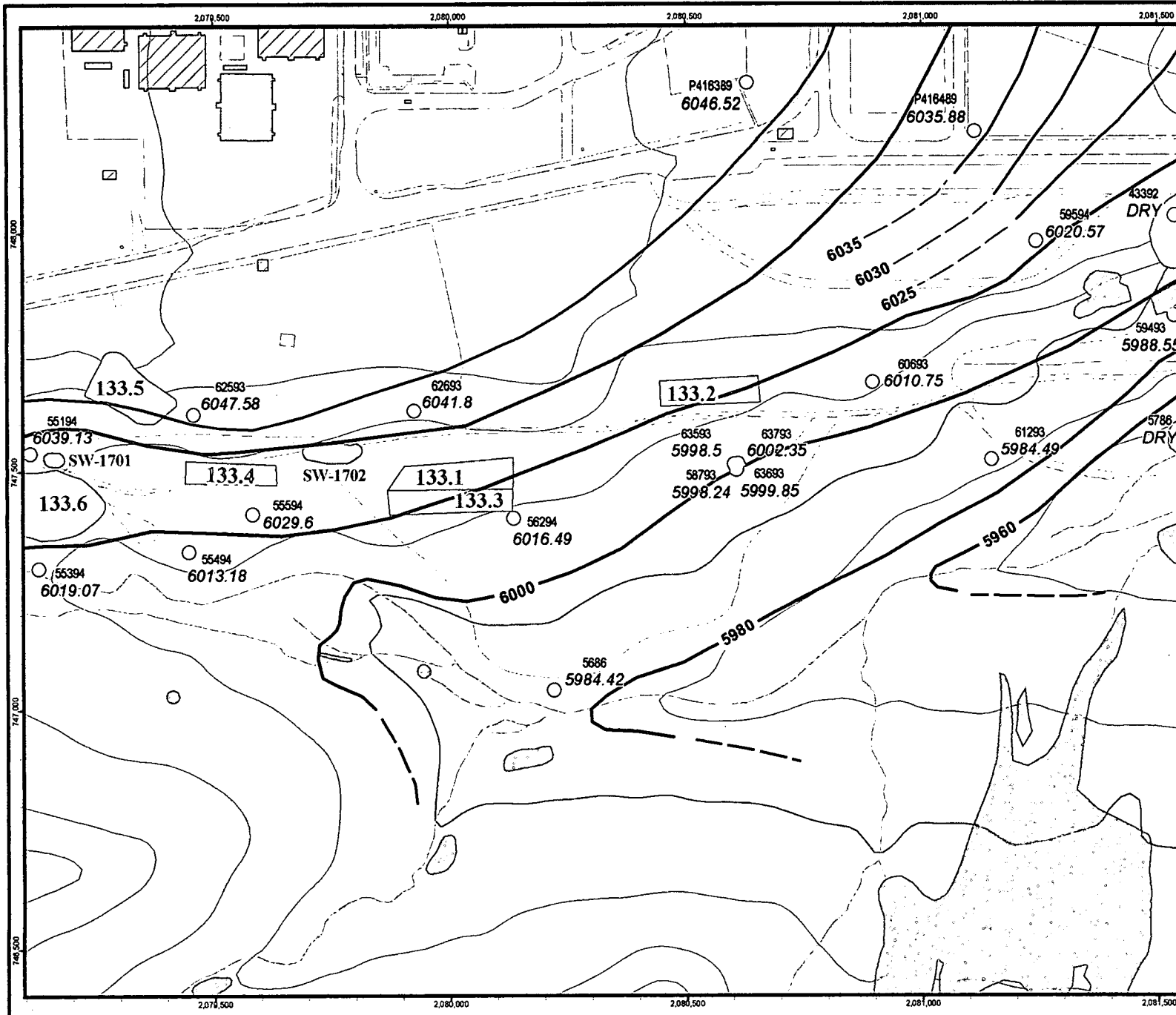


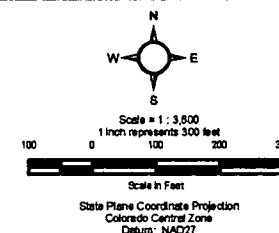
Figure 2

UHSU Potentiometric Surface
in the Vicinity of the Ash Pits,
2nd Quarter 2003

Legend

- Well with Groundwater Level Elevation
- Dry Well
- Potentiometric Contour (20 foot interval)
- - - Inferred Potentiometric Contour
- - - Potentiometric Contour (5 foot interval)
- - - Inferred Potentiometric Contour
- Approximate Current Extent of Unsaturated Alluvium
- Seep
- Area without Groundwater Elevation Data
- THSS
- PAC
- Building or other structure
- Demolished building or other structure
- Lake or pond
- Stream, ditch, or other drainage feature
- Paved road
- Dirt Road
- Trail
- Topographic contour (20-foot interval)

Source:
Modified from DOE, 2004

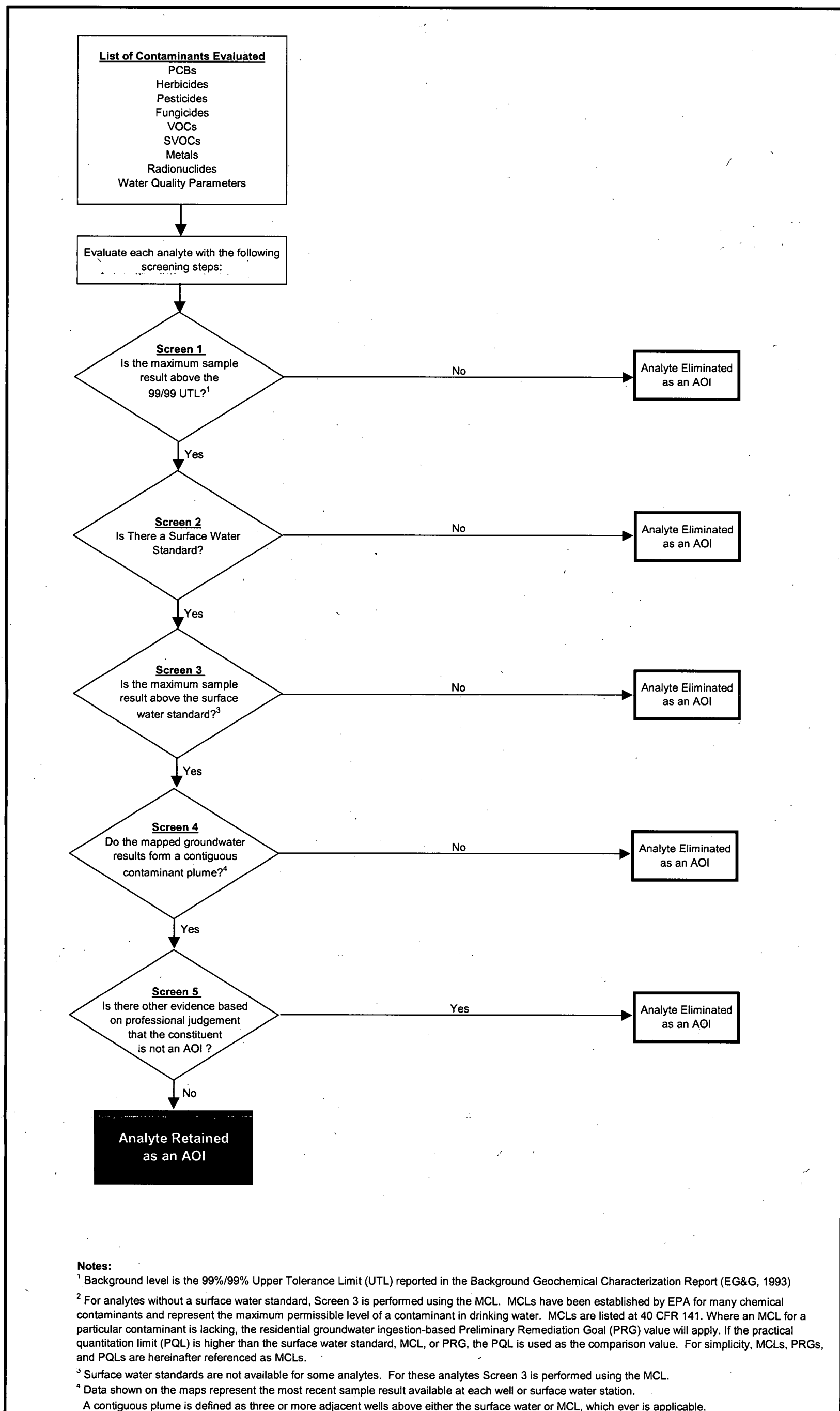


U.S. Department of Energy
Rocky Flats Environmental
Technology Site



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Figure 4
Ash Pits Preliminary Analyte of Interest (AOI) Identification Process



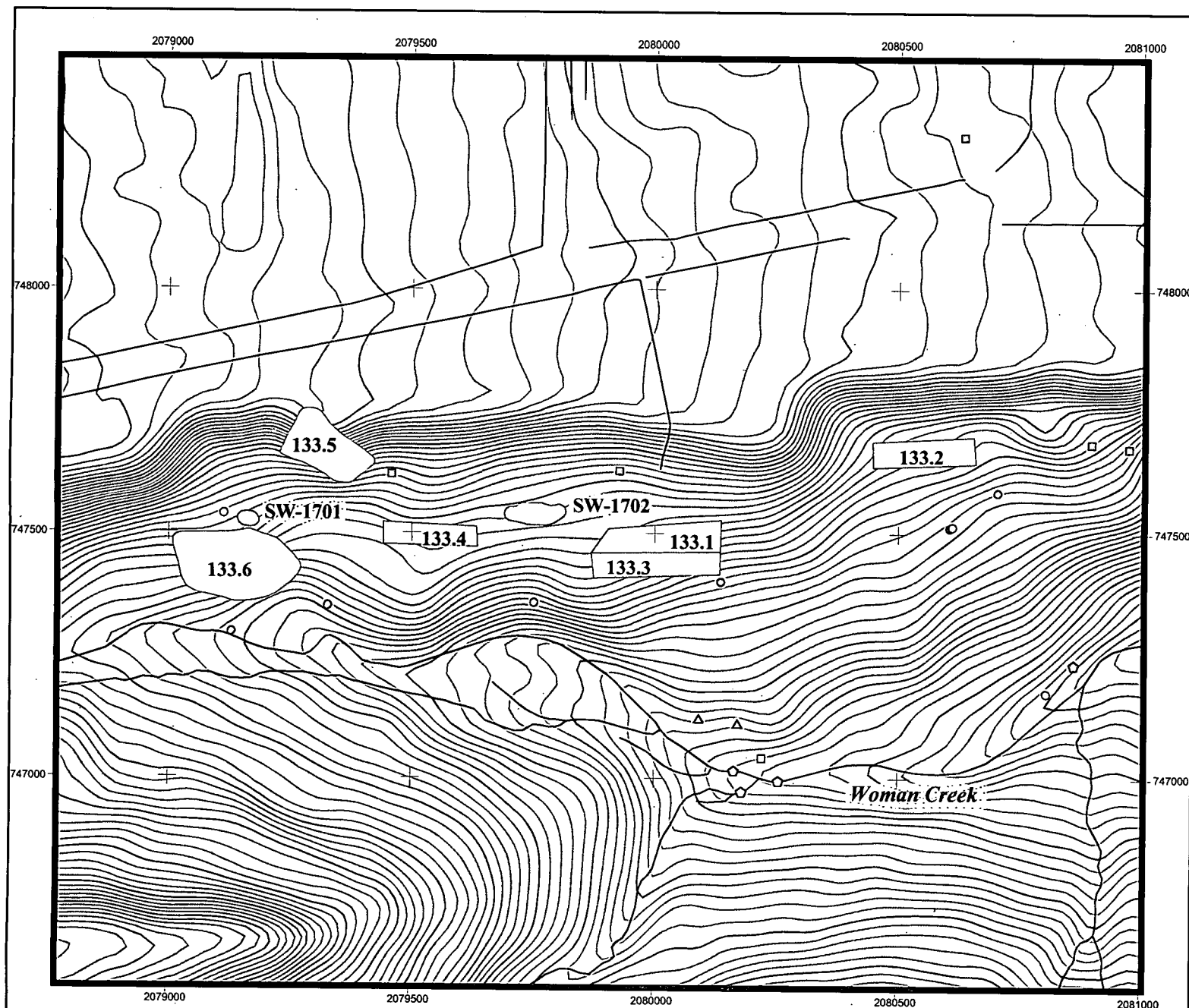


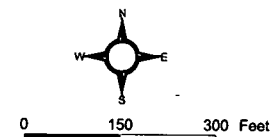
Figure 5
Aluminum - Dissolved
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental
Technology Site



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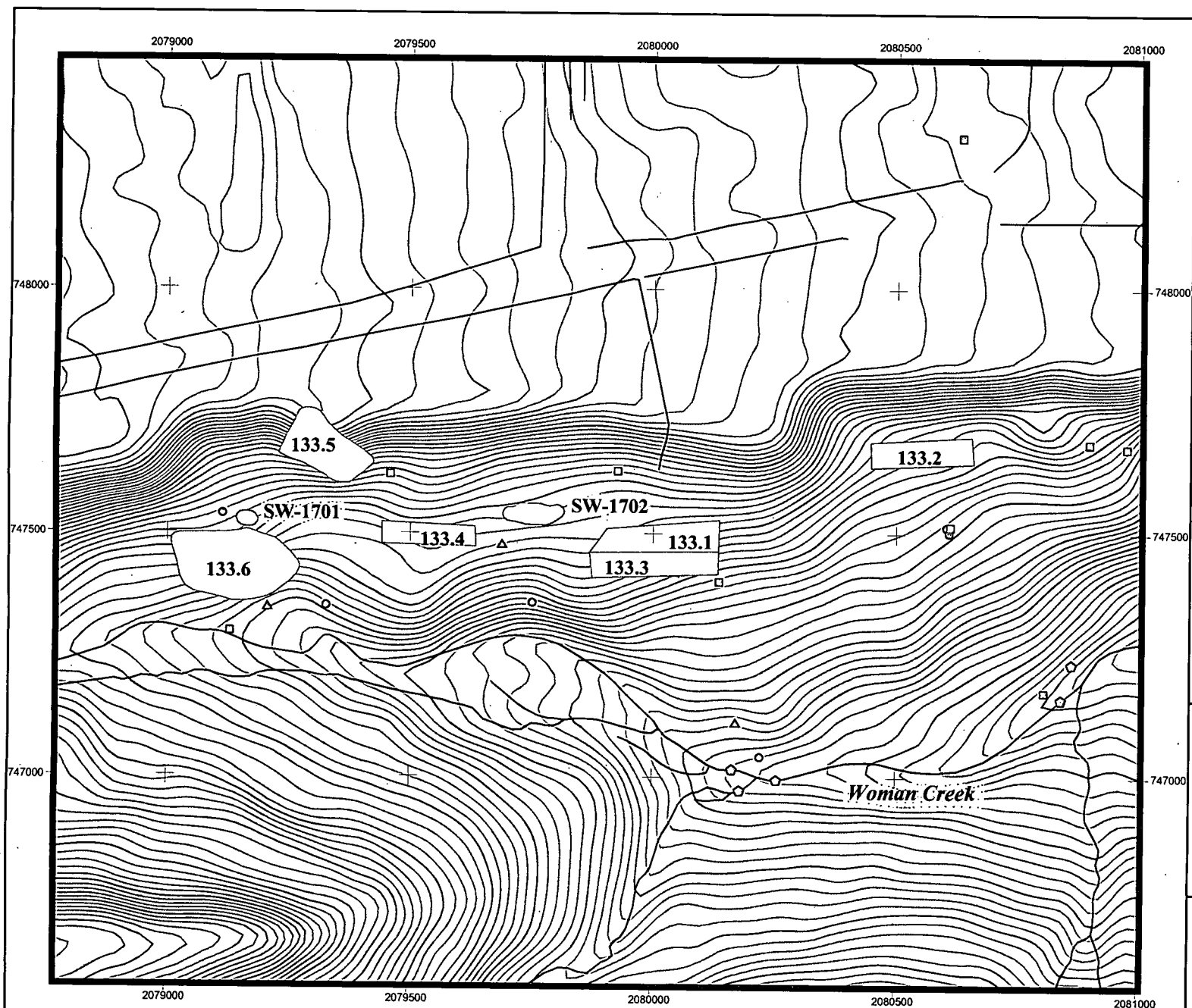


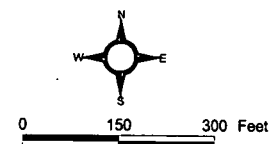
Figure 6
Antimony - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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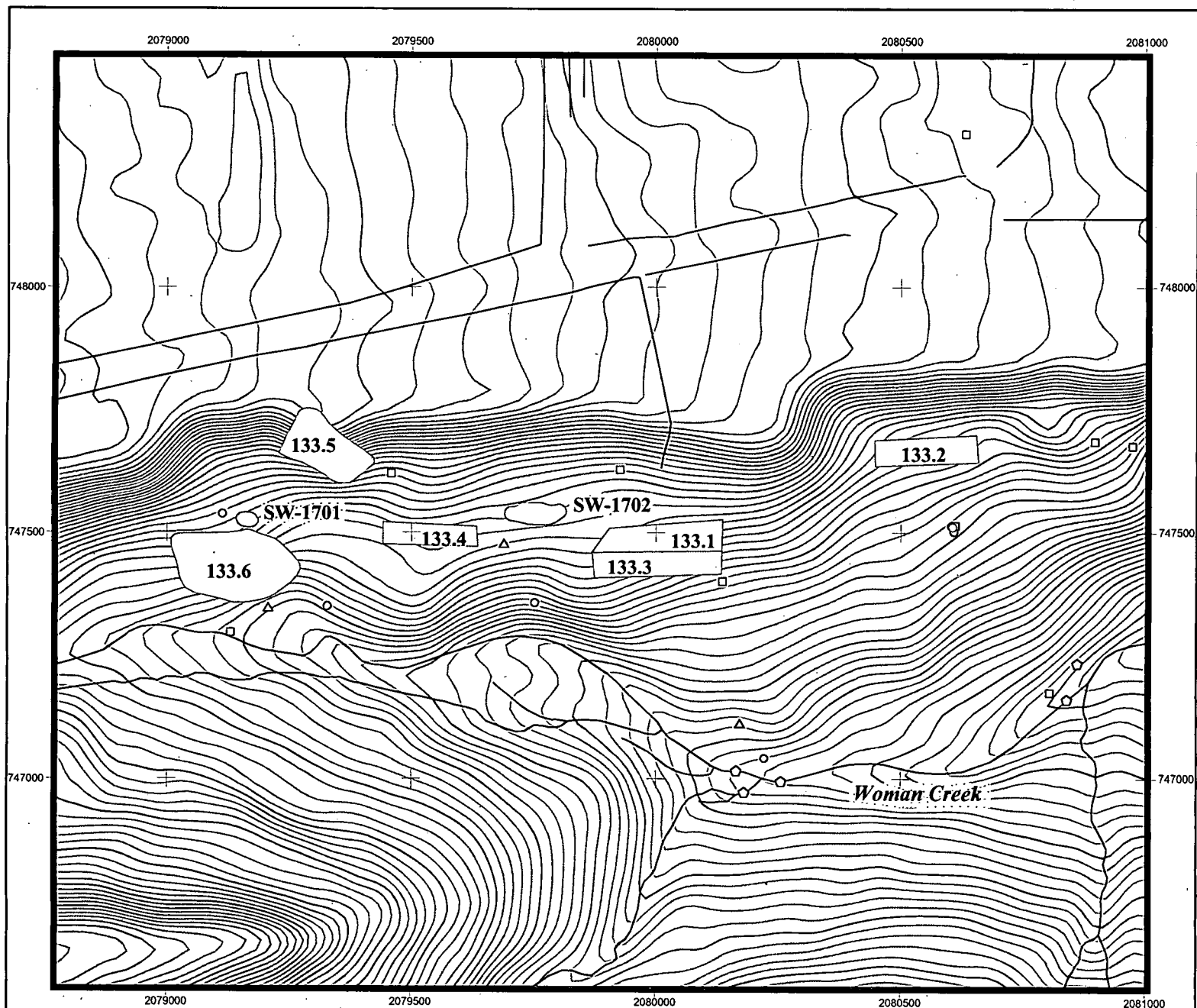


Figure 7
Barium - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

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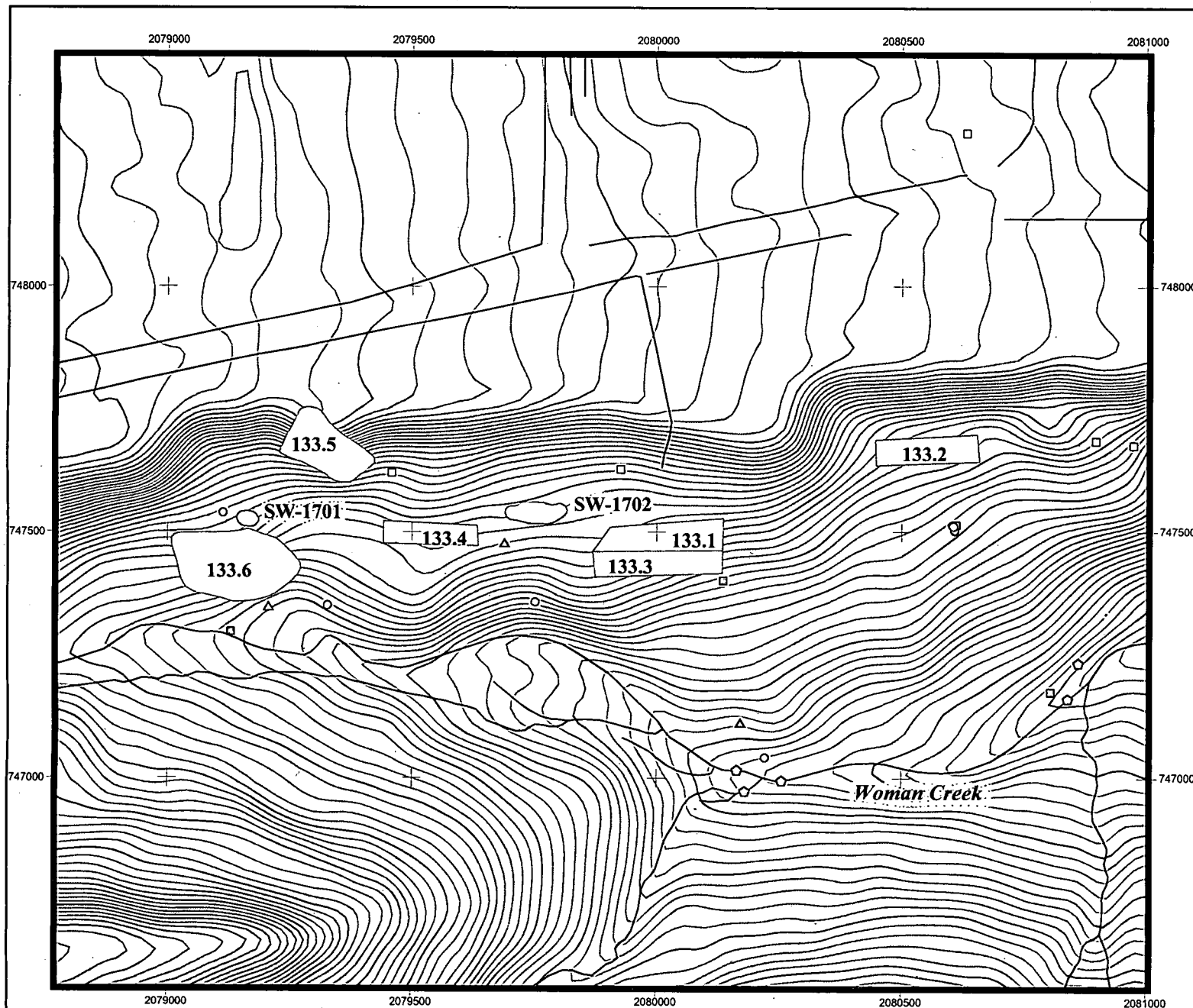


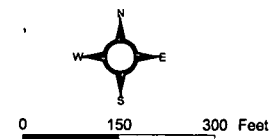
Figure 8
Beryllium - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ⬠ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

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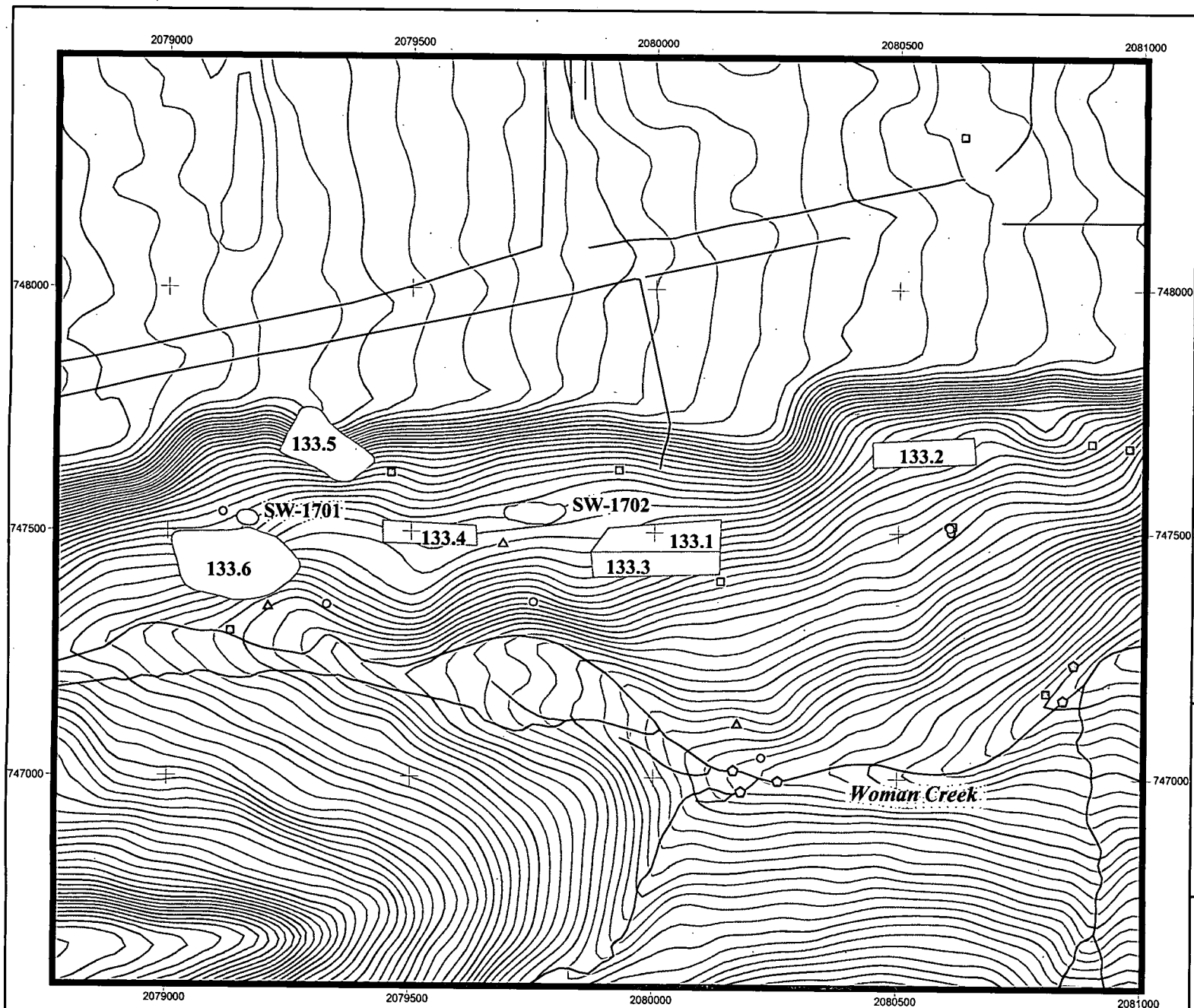


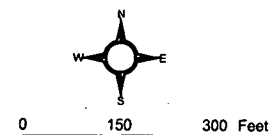
Figure 9
Cadmium - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

State Plane Coordinate Projection
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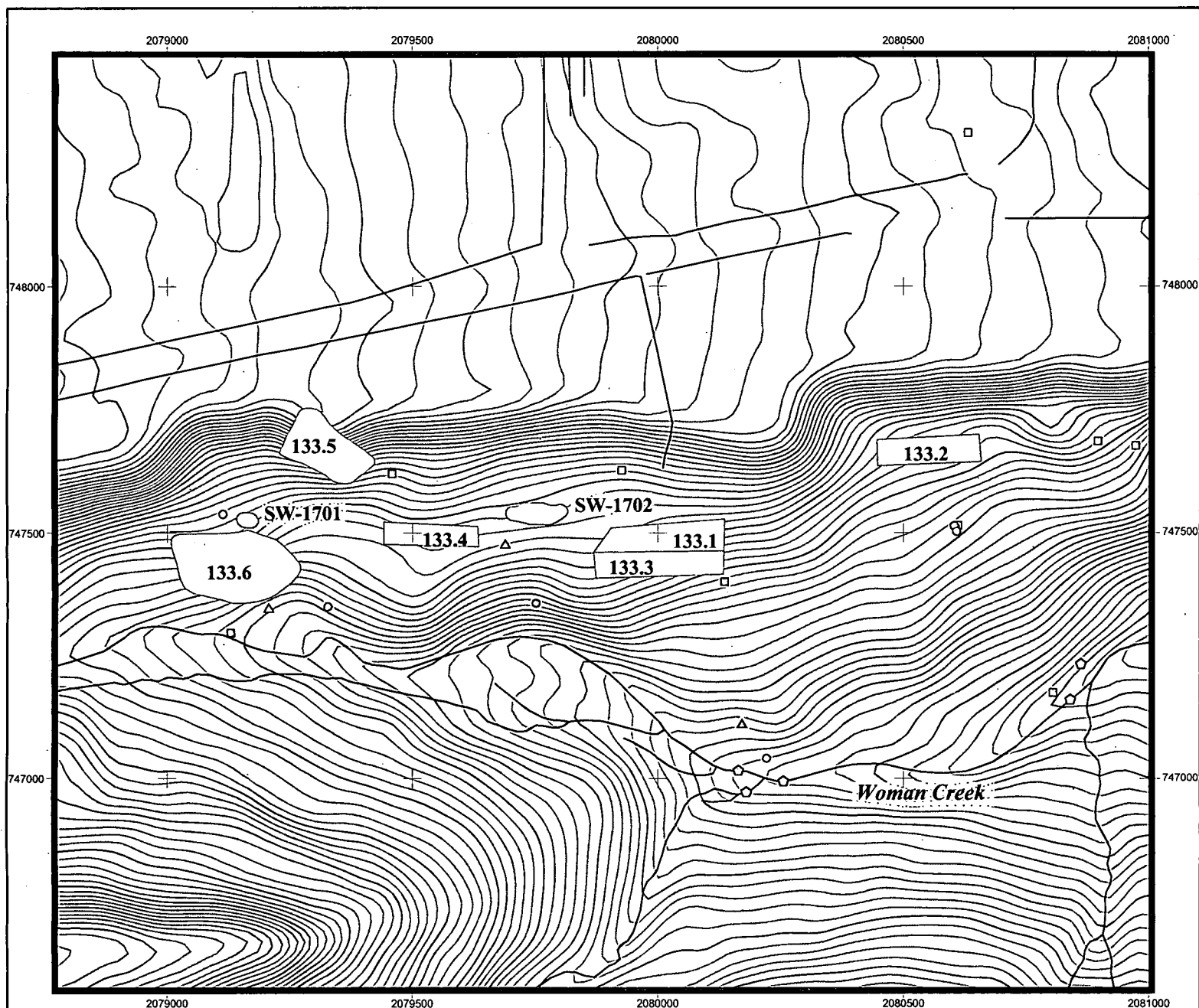


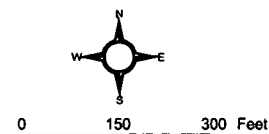
Figure 10
Chromium - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

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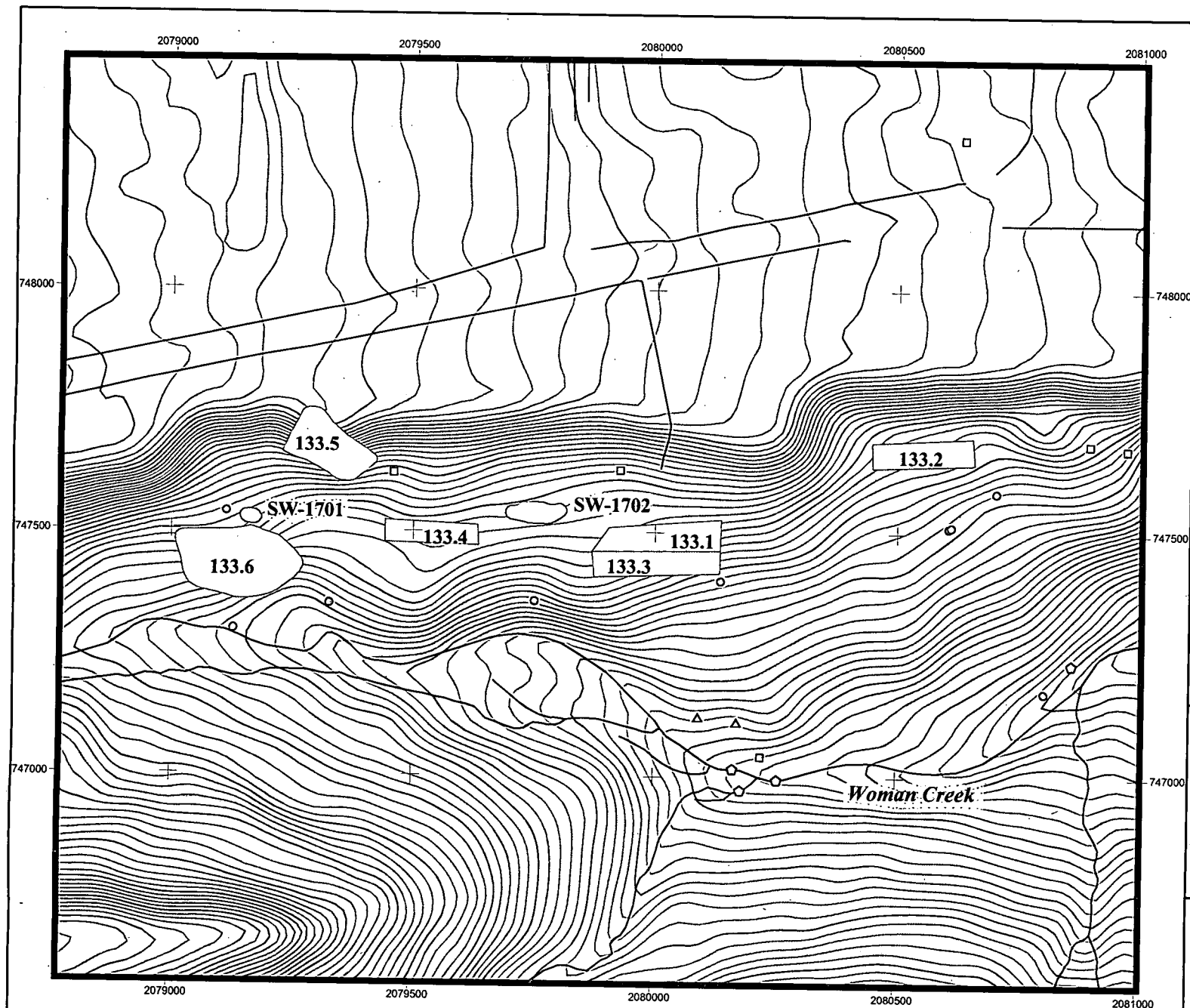


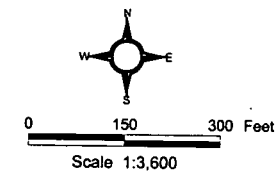
Figure 11
Copper - Dissolved
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ⬠ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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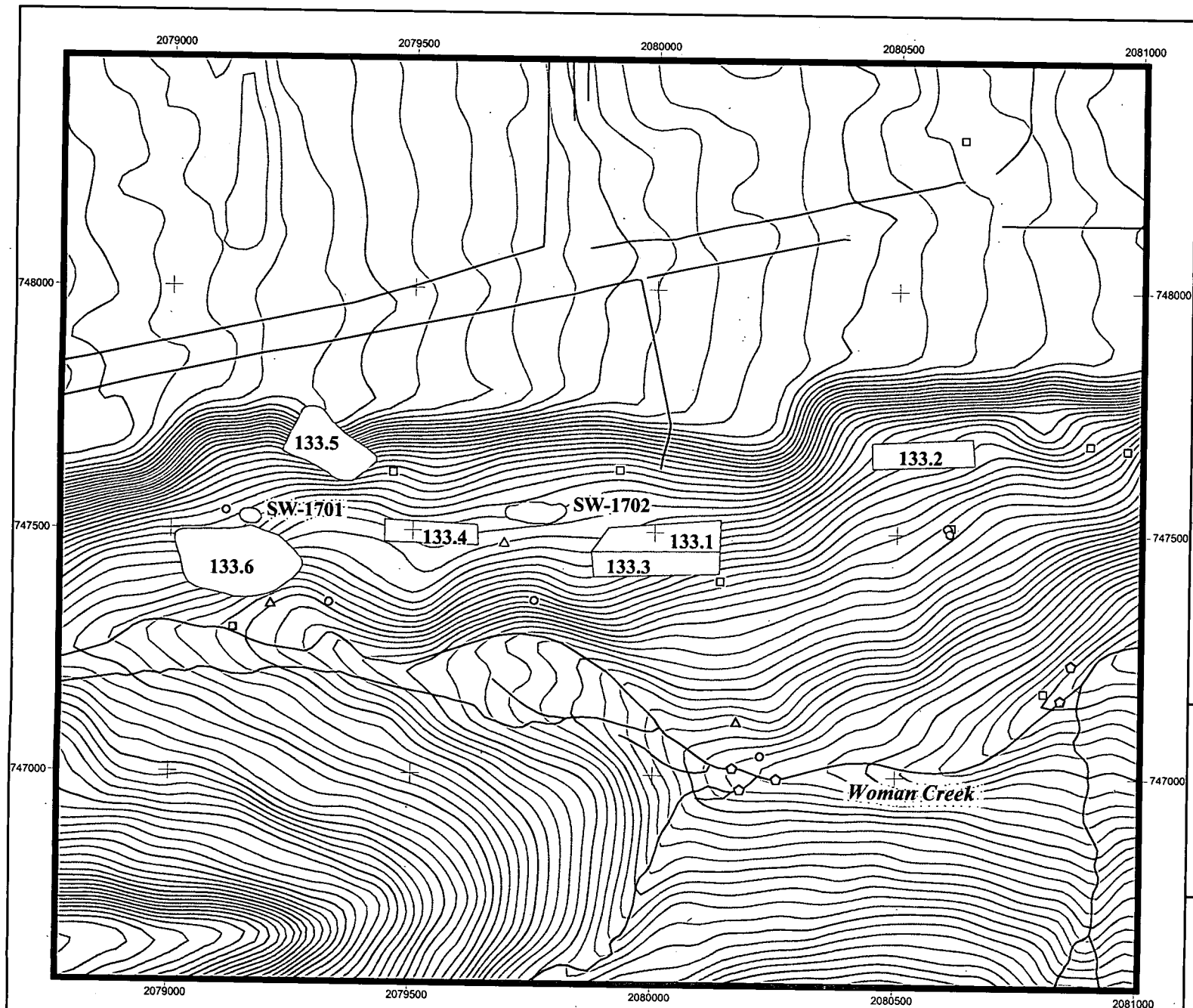


Figure 12
Copper - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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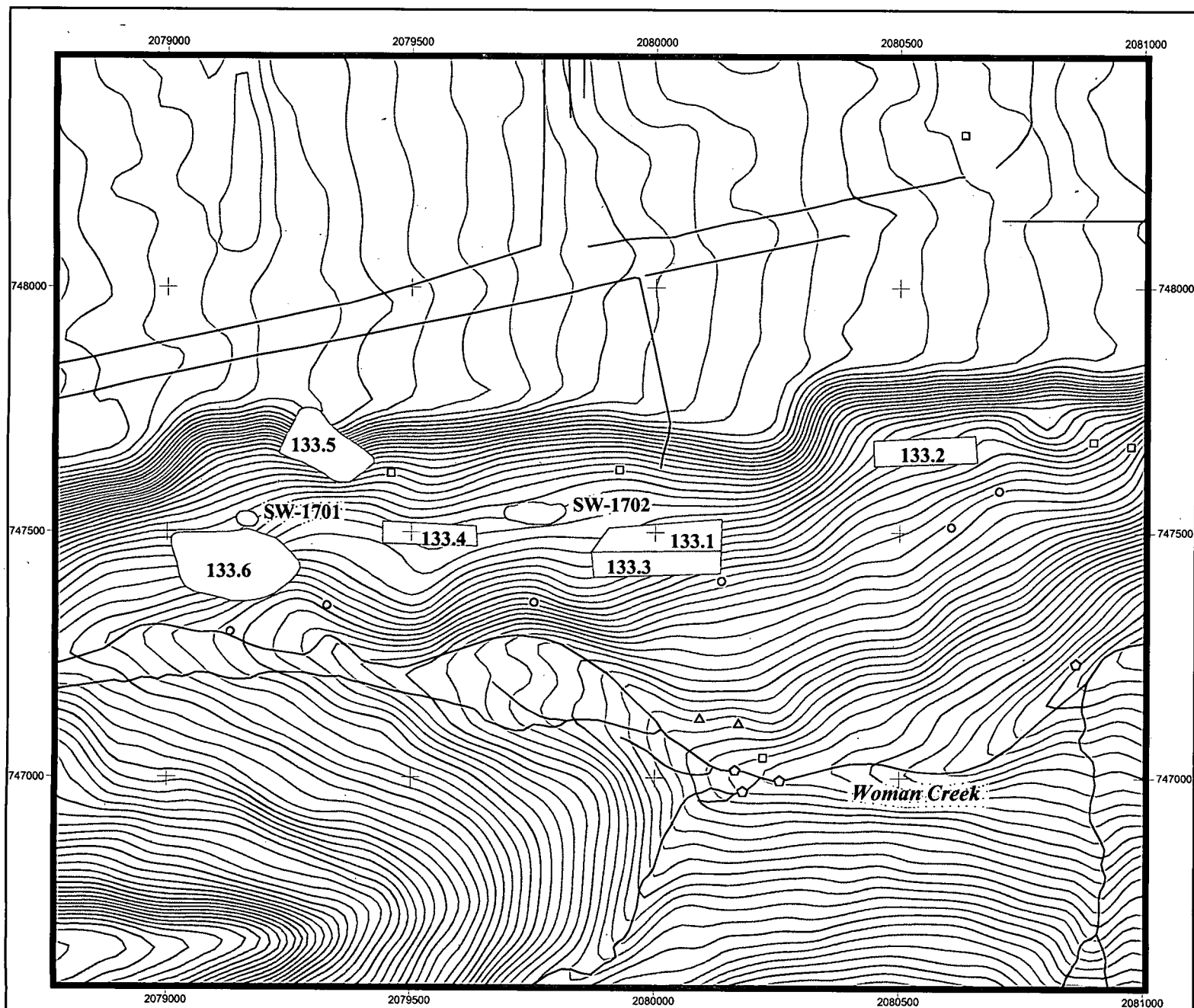


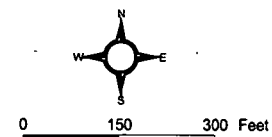
Figure 13
Iron - Dissolved
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- - - Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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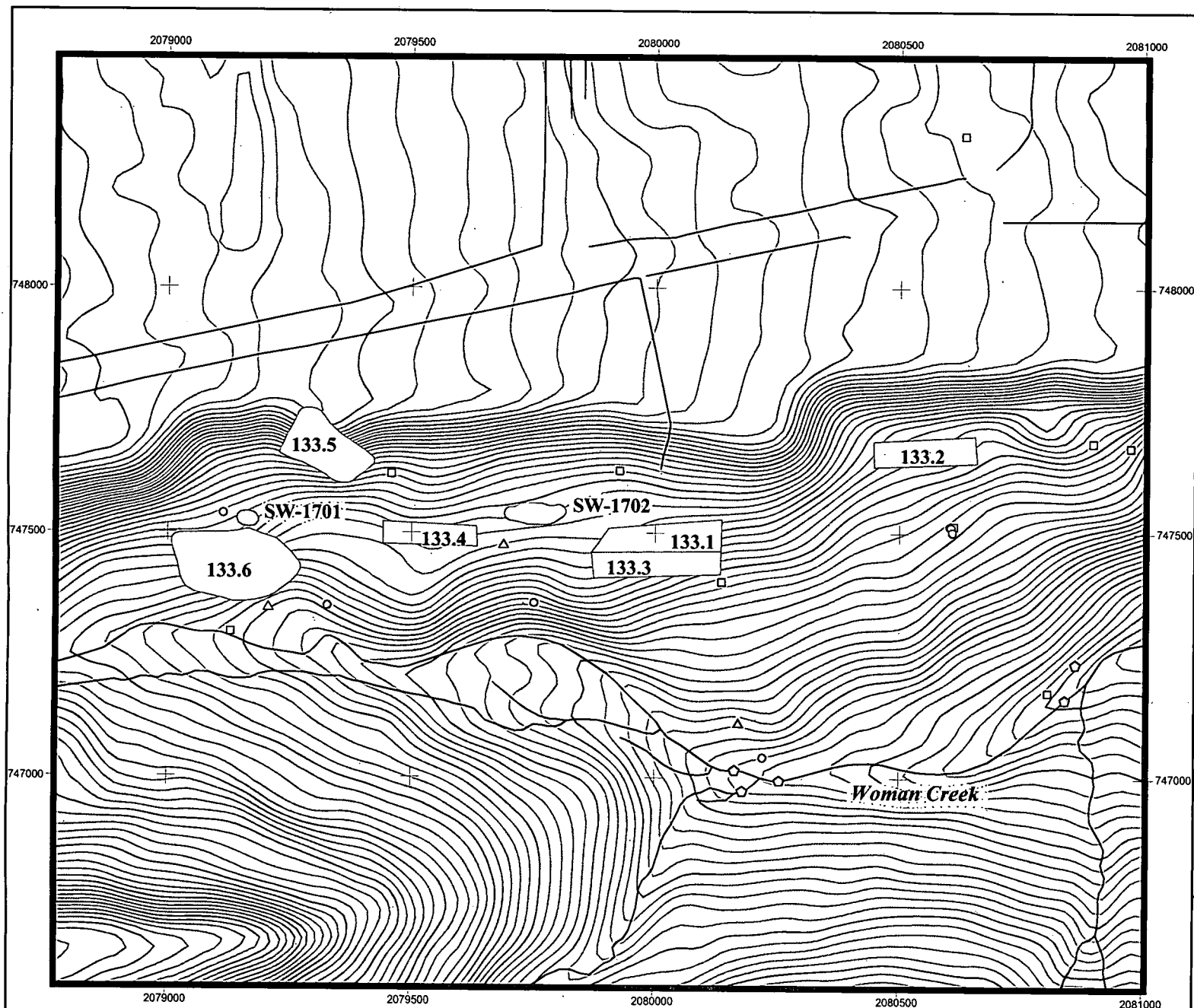


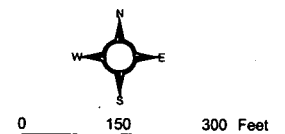
Figure 15
Lead - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ⬠ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

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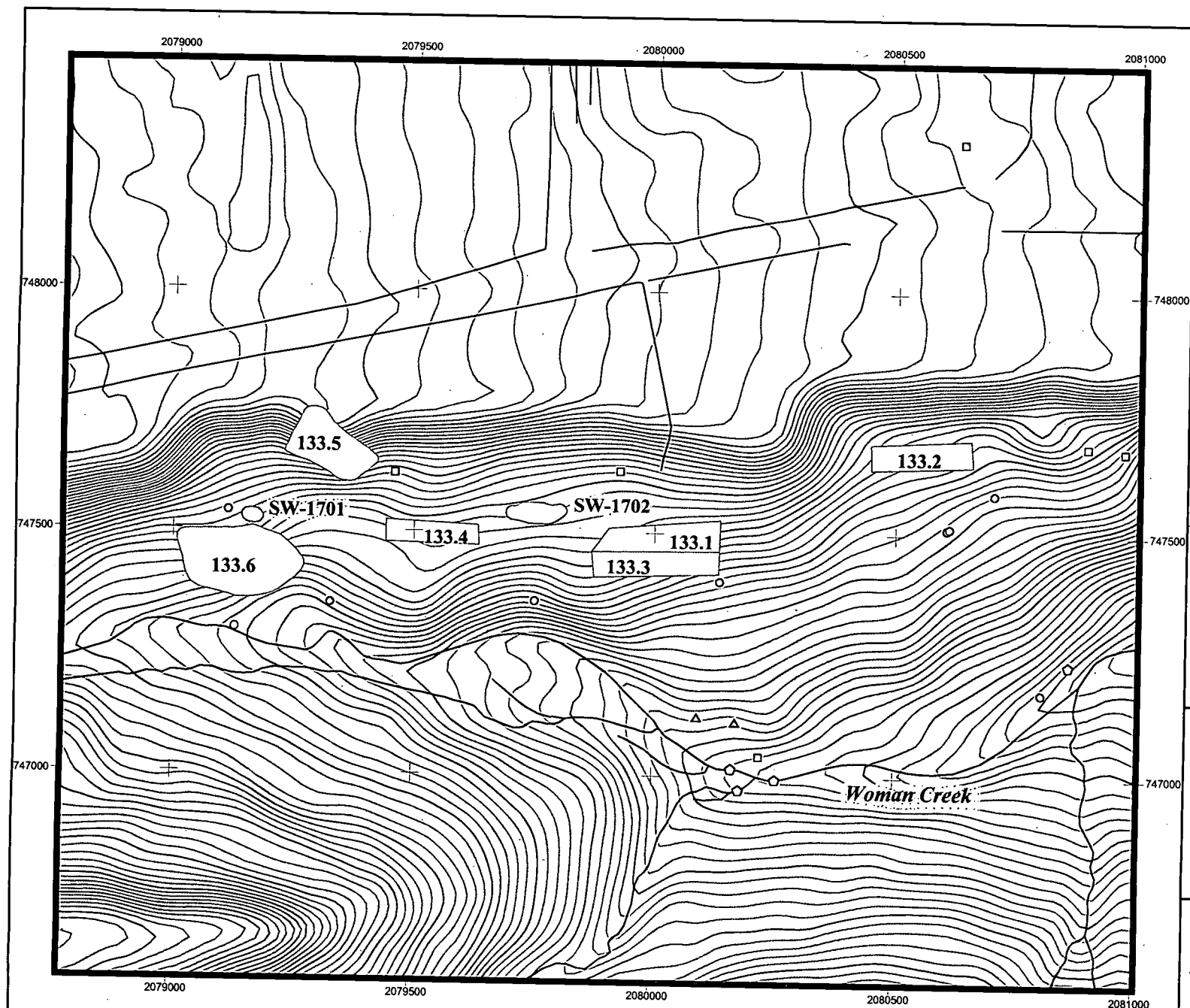


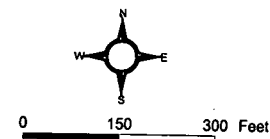
Figure 16
Manganese - Dissolved
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
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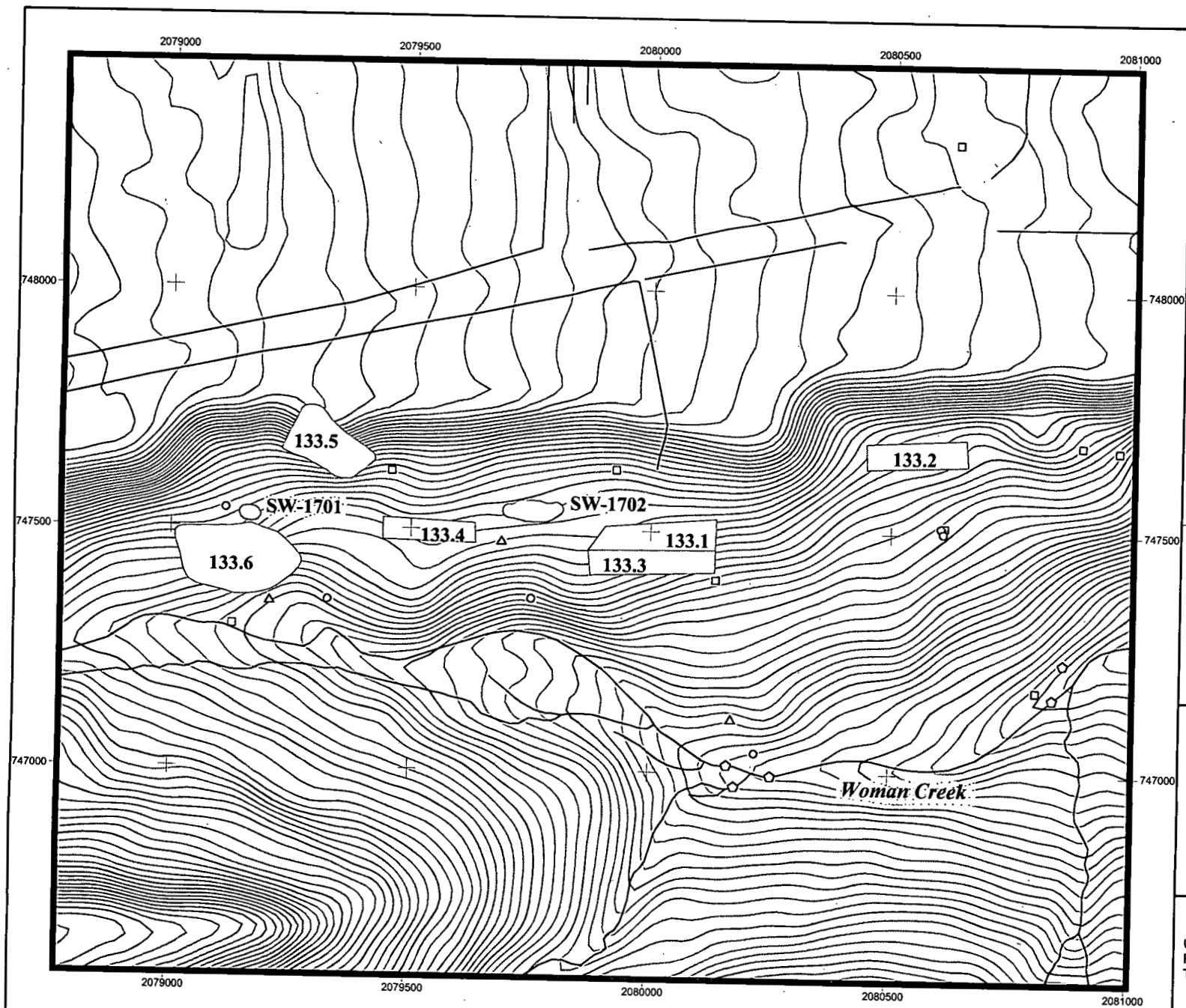


Figure 17
Manganese - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

State Plane Coordinate Projection
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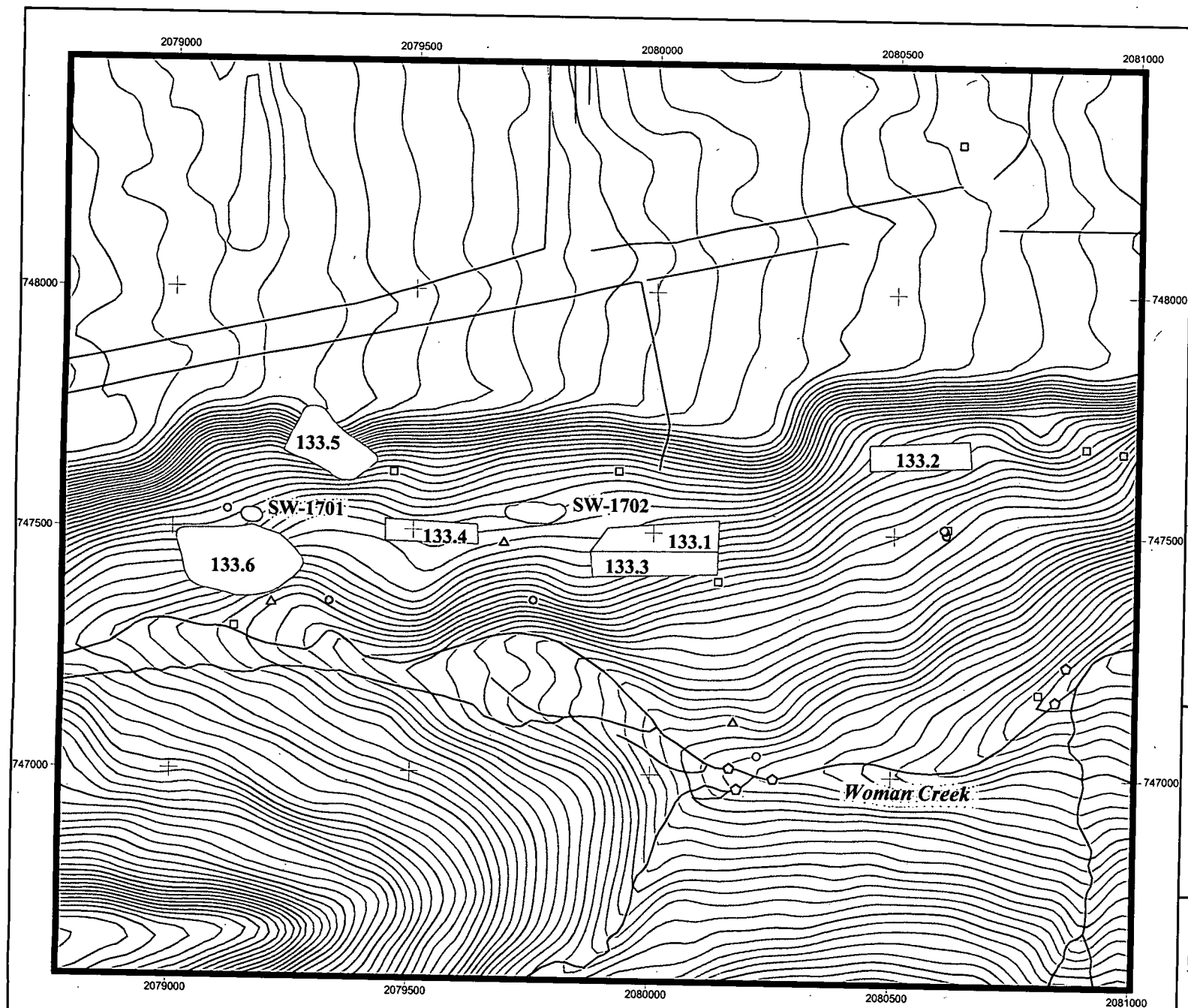


Figure 18
Nickel - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

State Plane Coordinate Projection
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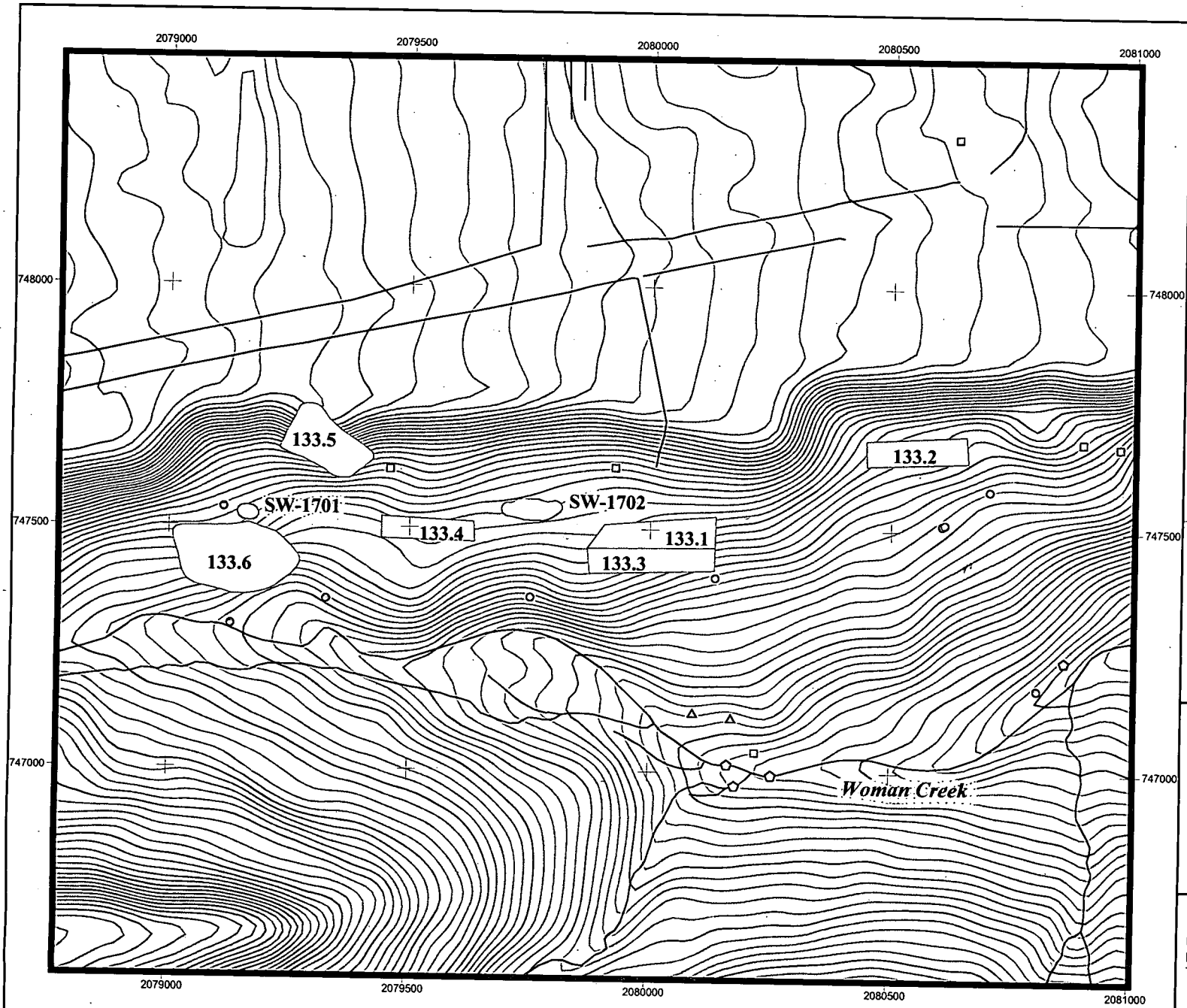


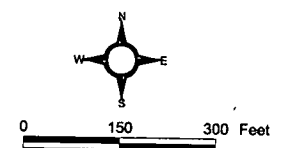
Figure 19
Silver - Dissolved
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
 State Plane Coordinate Projection
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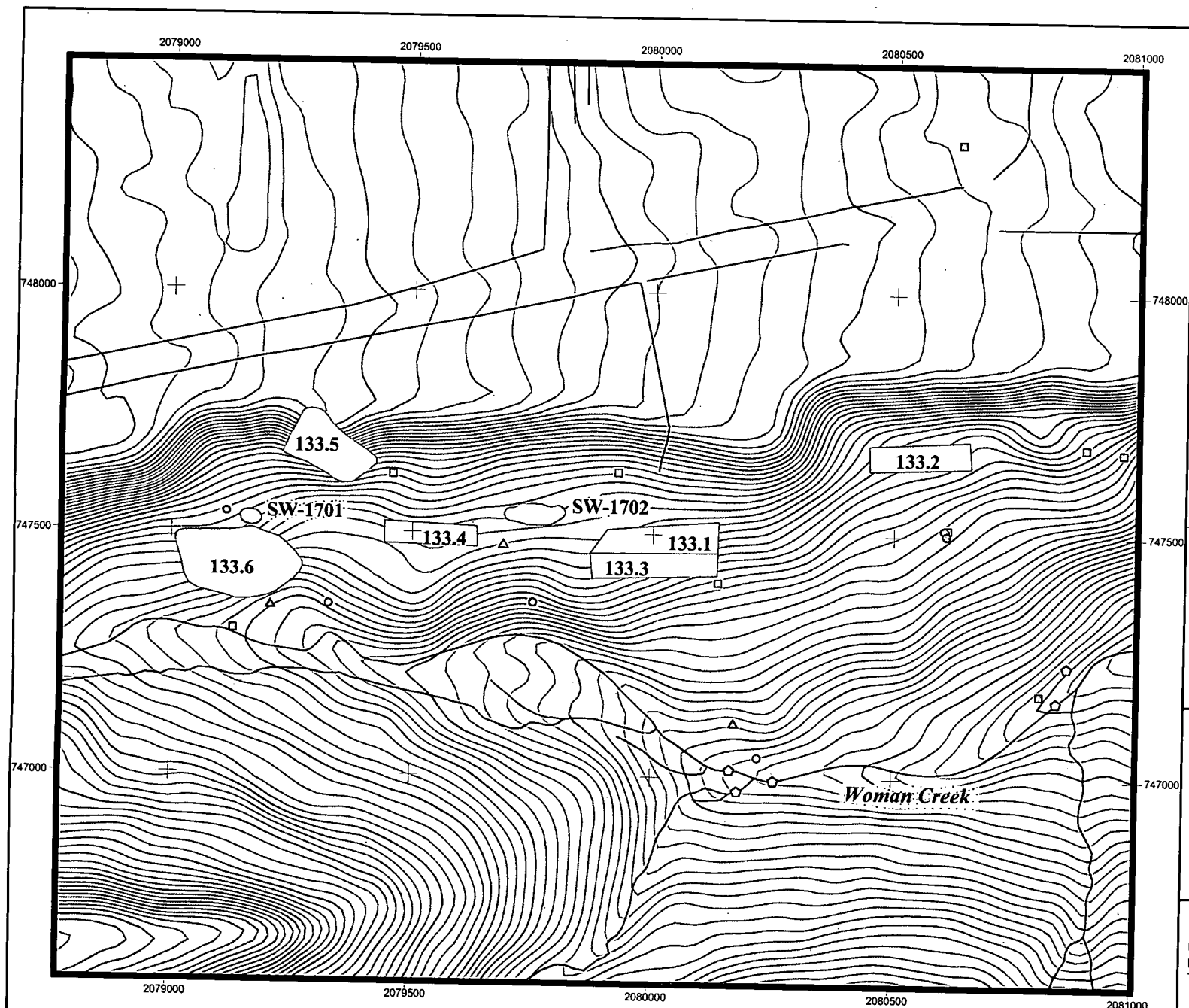


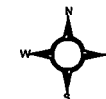
Figure 20
Silver - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

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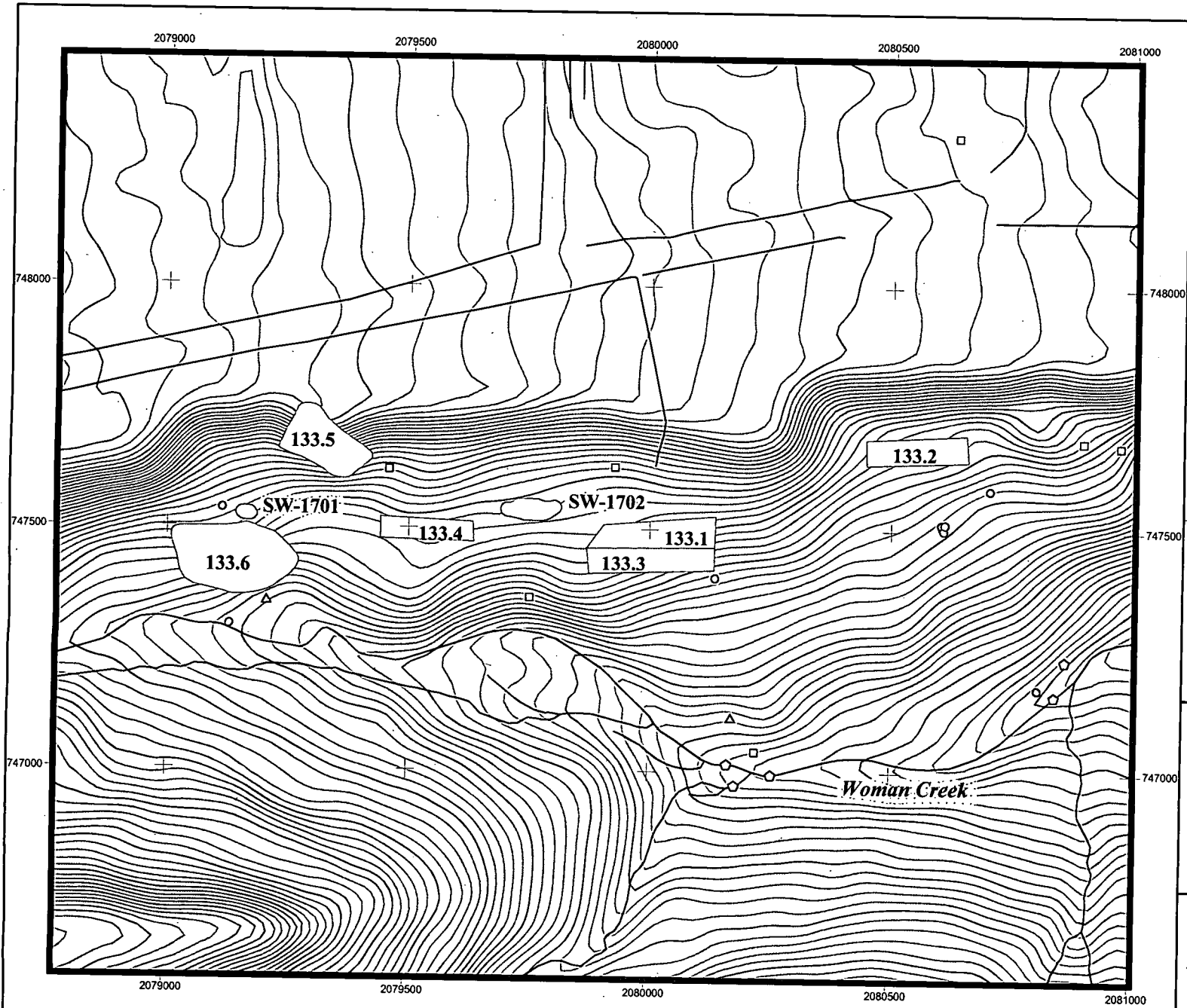


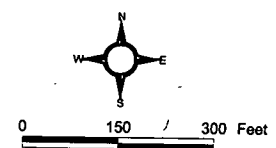
Figure 21
Americium-241 - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
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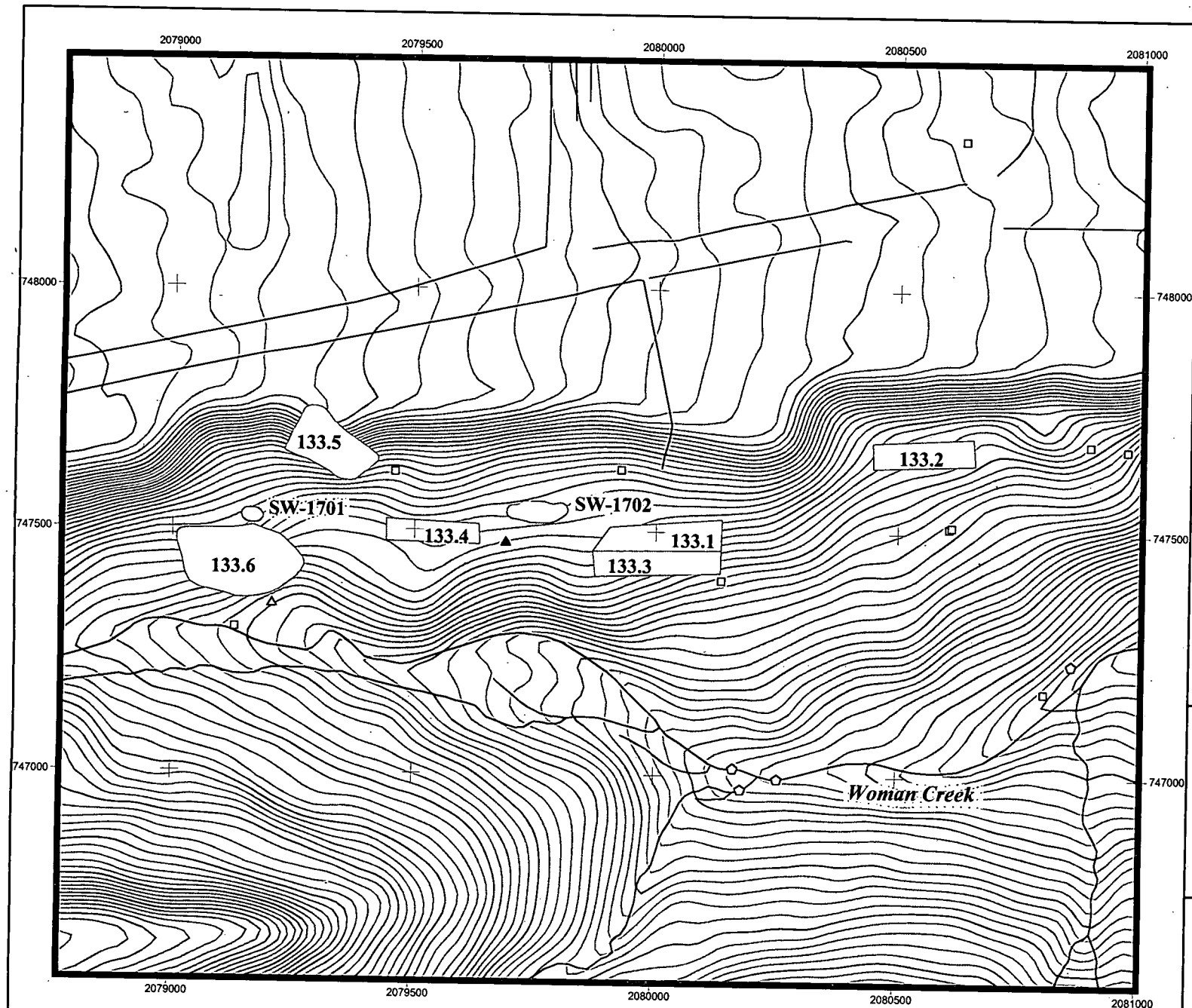


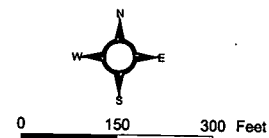
Figure 22
Gross Alpha - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

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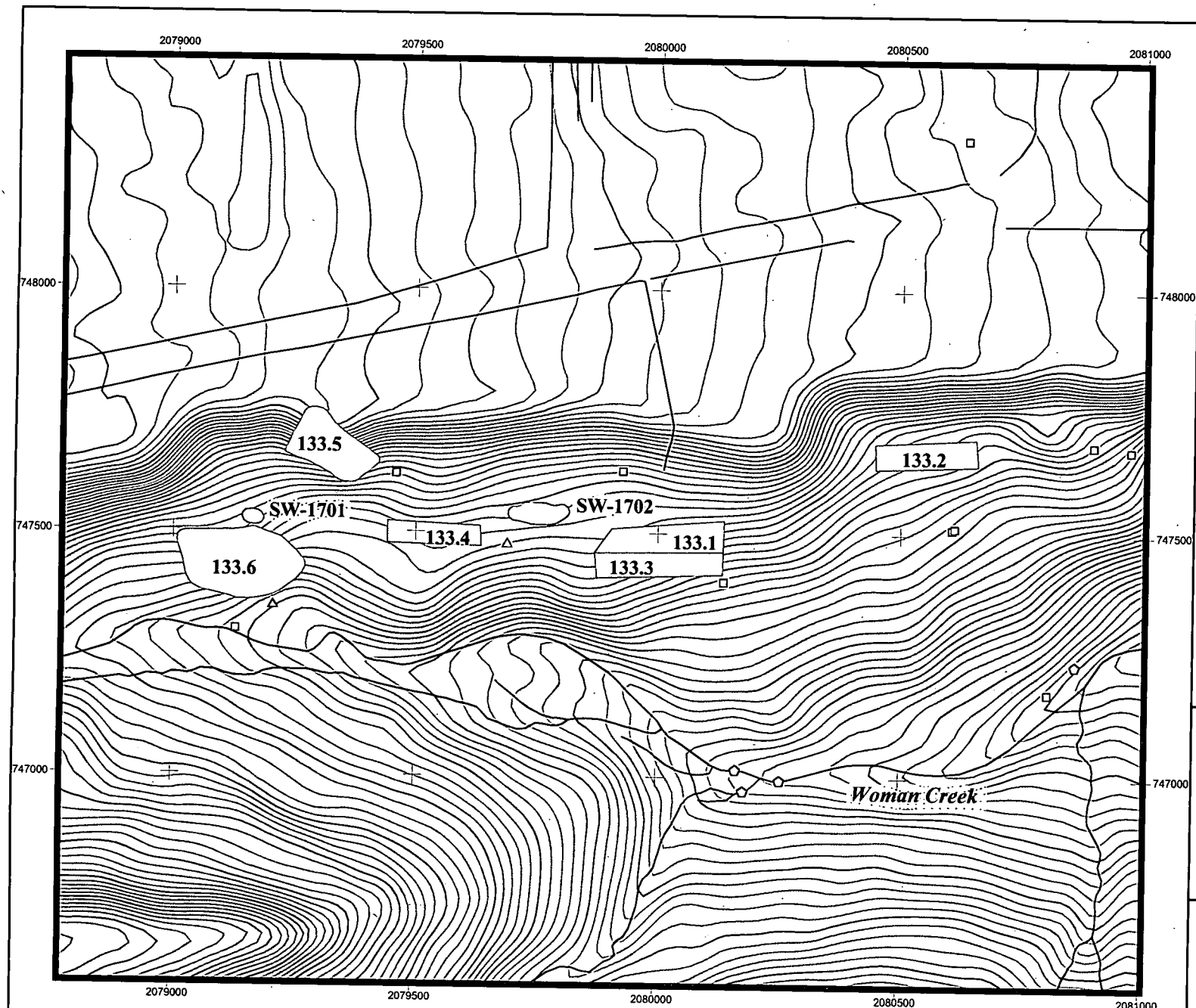


Figure 23
Gross Beta - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- - - Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

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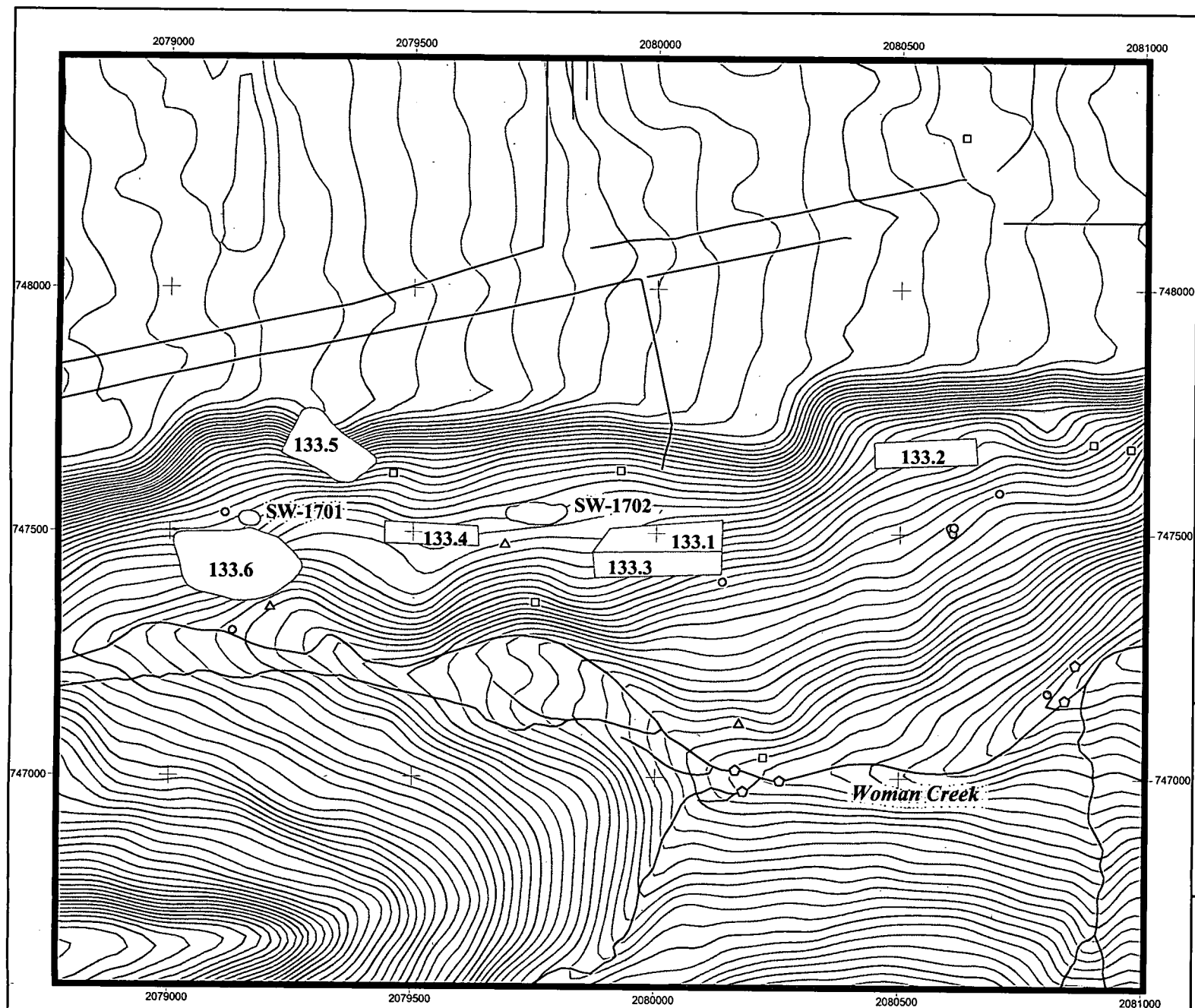


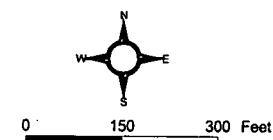
Figure 24
Plutonium-239/240 - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ⬠ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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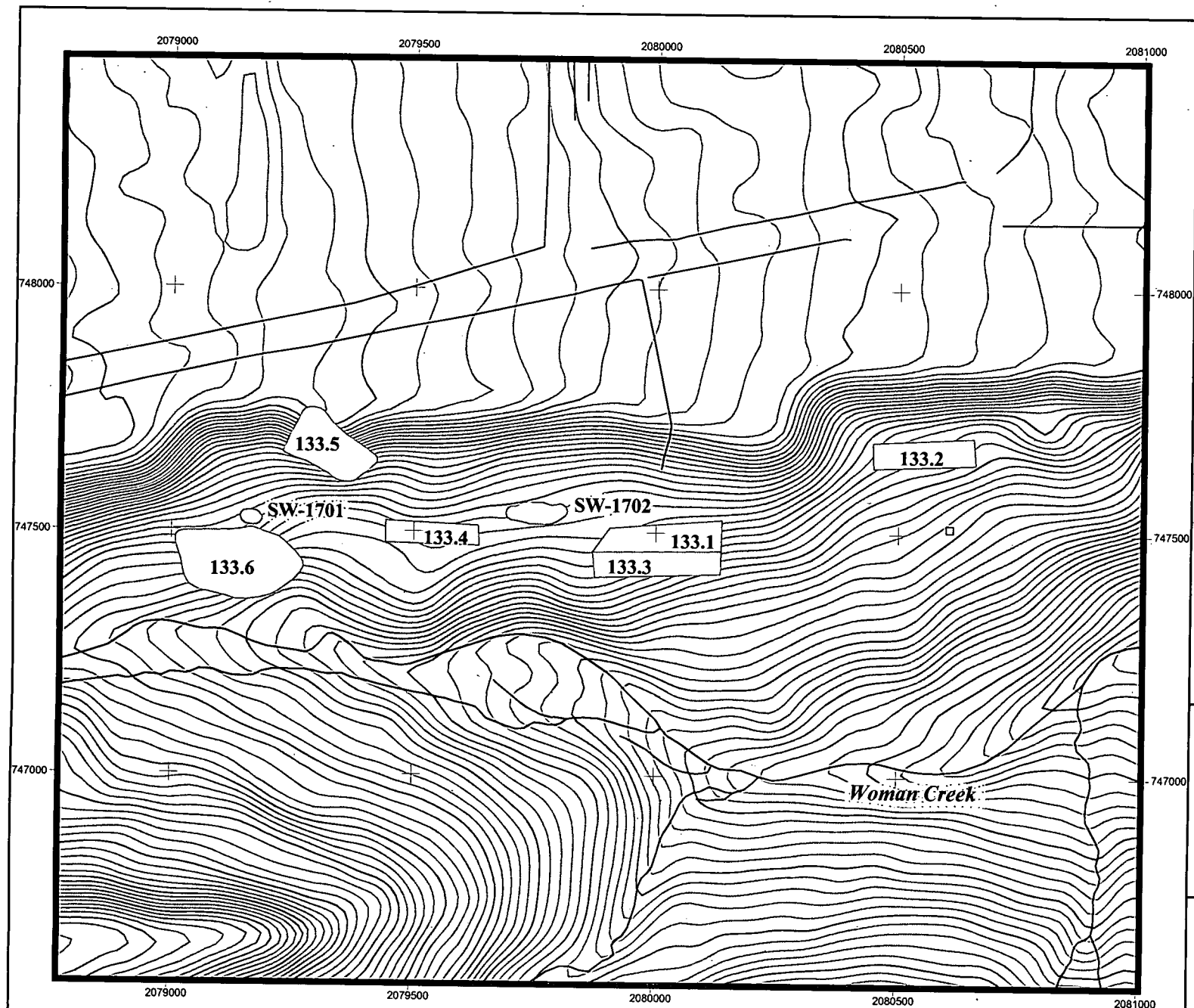


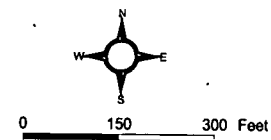
Figure 25
Ra226 + Ra228 - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
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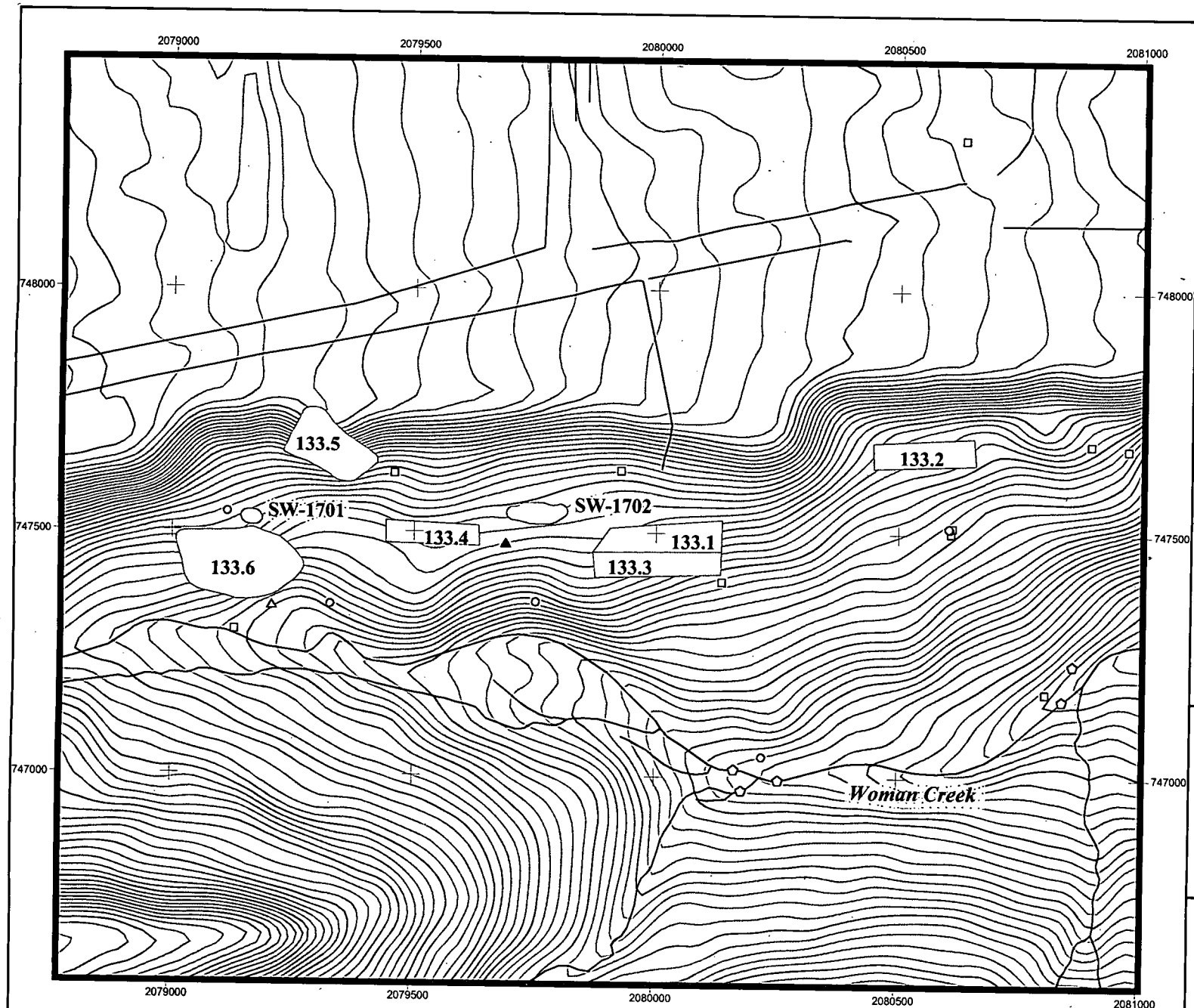


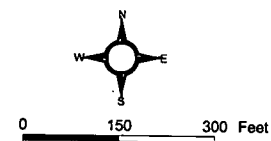
Figure 26
Uranium Isotopes - Total
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Detected and ≤ 99/99 UTL
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Technology Site



File: W:\Projects\FY2005\Groundwater-Reports\
ash-pit_Final.apr

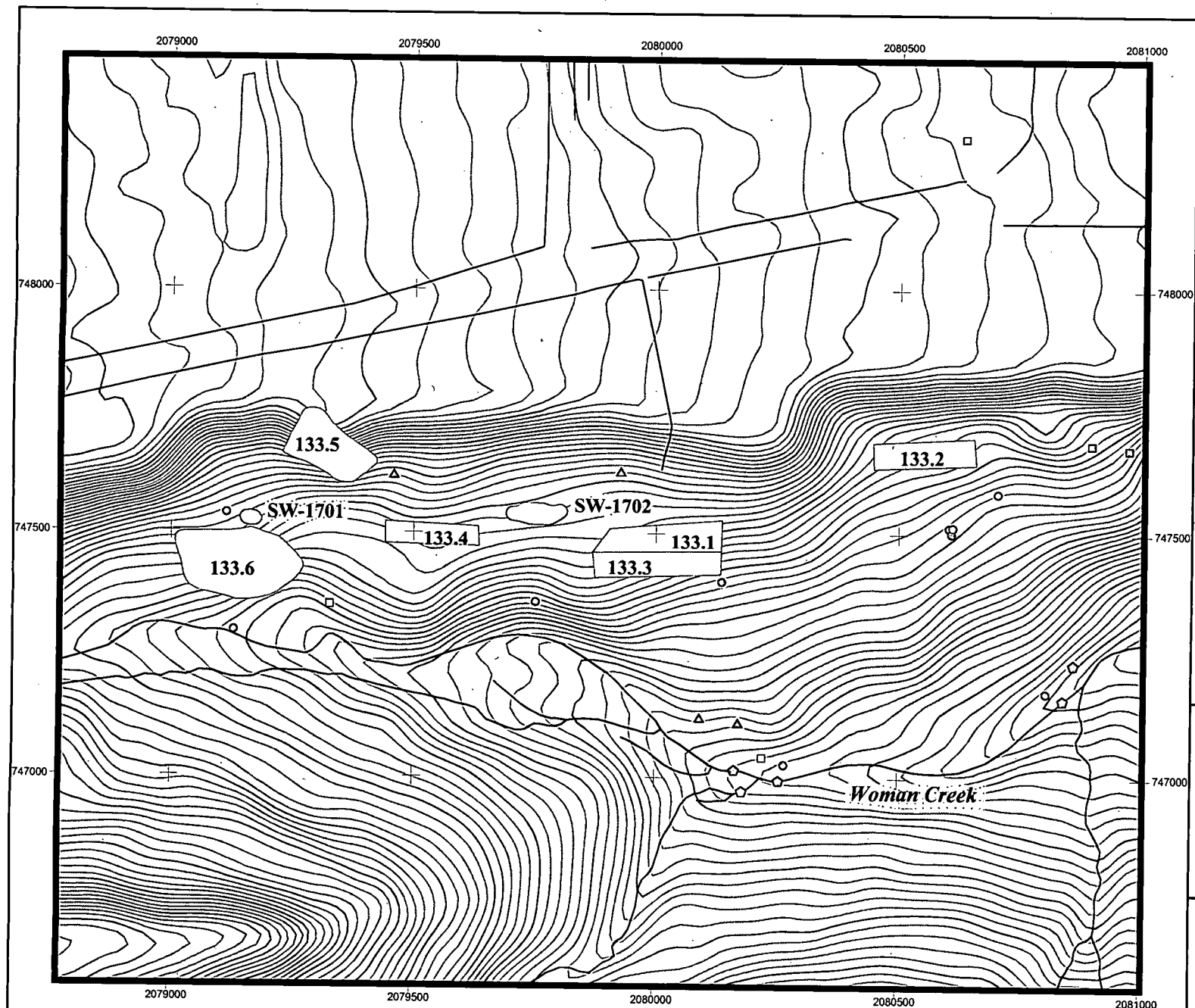


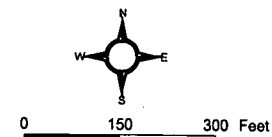
Figure 27
Methylene Chloride
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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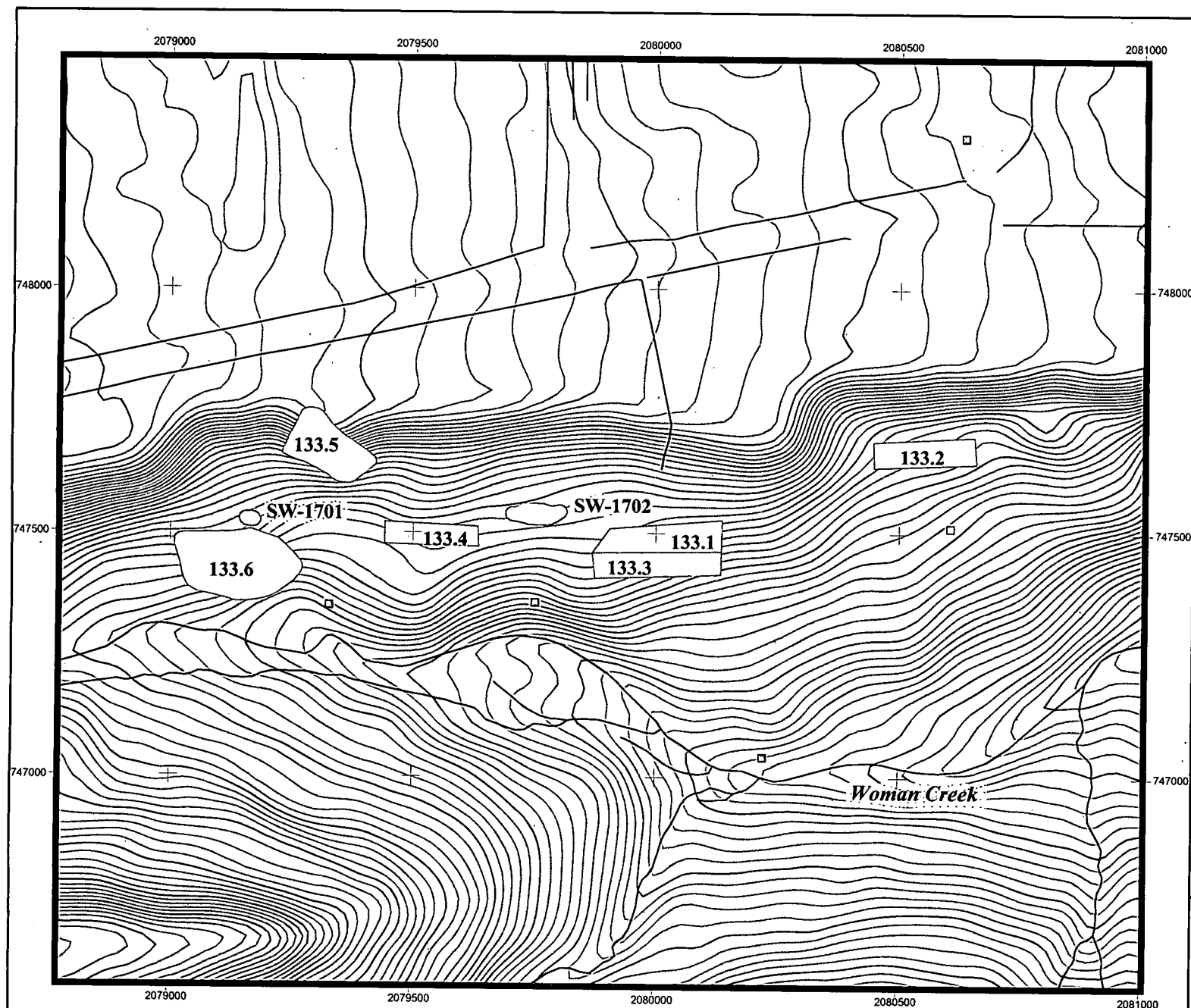


Figure 28
Ammonia (as N)
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- ◇ Surface Water Sample Location
- > 100x MCL
- > MCL and ≤ 100x MCL
- > Surface Water Standard and ≤ MCL
- Detected and ≤ Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- Site boundary
- Topographic contour (2 - foot)



0 150 300 Feet

Scale 1:3,600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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ash-pit_Final.apr

Figure 29

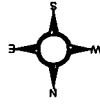
Cyanide
Ash Pit Sample Locations

KEY

- Sample Collected Since January 1, 2000
- Sample Collected Between January 1, 1995 and December 31, 1999
- △ Sample Collected Between June 28, 1991 and December 31, 1994
- Surface Water Sample Location
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not Applicable
- Not Detected

Standard Map Features

- Historical Individual Hazardous Substance Site (IHSS) location
- Historical Potential Area of Concern (PAC) location
- Pond
- Stream
- - Site boundary
- Topographic contour (2 - foot)



Scale 1:3,600
0 150 300 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27



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